

Appendix A

Appendix Tables

Chapter 1. Elementary and Secondary Education

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Appendix table 1-1.

Proportion of high school graduates earning credits in science courses, by sex: 1982, 1987, 1990, and 1994
 (Percentages)

Year of graduation and sex	Any science	Survey science	Biology	AP/honors biology	Chemistry	AP chemistry	Physics	AP/honors physics
1982 graduates								
All	96.5 (0.3)	62.1 (1.2)	76.6 (0.8)	9.7 (0.5)	31.1 (0.8)	3.0 (0.4)	14.4 (0.5)	1.1 (0.1)
Male	96.3 (0.3)	63.6 (1.4)	74.5 (0.9)	9.0 (0.5)	32.2 (1.2)	3.5 (0.5)	19.1 (1.0)	1.5 (0.2)
Female	96.7 (0.3)	60.8 (1.3)	78.6 (1.1)	10.3 (0.8)	30.2 (0.7)	2.4 (0.5)	10.2 (0.4)	0.7 (0.1)
1987 graduates								
All	99.1 (0.2)	61.3 (3.1)	87.9 (1.0)	9.5 (0.8)	43.8 (1.1)	3.3 (0.4)	19.3 (0.9)	1.7 (0.3)
Male	98.8 (0.2)	61.8 (3.0)	86.3 (1.2)	9.4 (0.8)	44.3 (1.3)	3.9 (0.5)	24.1 (1.0)	2.5 (0.4)
Female	99.3 (0.1)	60.7 (3.3)	89.5 (0.8)	9.6 (1.0)	43.2 (1.2)	2.7 (0.3)	14.7 (0.9)	0.9 (0.2)
1990 graduates								
All	99.4 (0.1)	68.1 (1.8)	91.1 (1.0)	10.1 (1.0)	48.9 (1.3)	3.5 (0.5)	21.6 (0.8)	2.0 (0.4)
Male	99.1 (0.3)	69.6 (1.9)	89.6 (1.1)	9.3 (1.0)	47.7 (1.4)	4.1 (0.5)	25.4 (0.9)	2.5 (0.5)
Female	99.7 (0.1)	66.7 (1.9)	92.4 (0.9)	10.8 (1.2)	50.0 (1.3)	2.9 (0.5)	18.0 (0.9)	1.6 (0.3)
1994 graduates								
All	99.6 (0.1)	71.2 (2.0)	93.4 (1.0)	11.8 (0.9)	55.7 (1.1)	4.0 (0.5)	24.6 (0.8)	2.7 (0.3)
Male	99.5 (0.2)	72.6 (2.0)	92.0 (1.1)	10.9 (0.9)	52.8 (1.1)	4.1 (0.6)	27.1 (1.0)	3.4 (0.4)
Female	99.8 (0.1)	69.9 (2.1)	94.7 (0.9)	12.7 (1.1)	58.5 (1.2)	3.7 (0.5)	22.2 (0.9)	2.0 (0.3)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates*, NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-1.

Science & Engineering Indicators – 1998

Appendix table 1-2.

Proportion of high school graduates earning credits in science courses, by race/ethnicity: 1982, 1987, 1990, and 1994
 (Percentages)

Year of graduation and race/ethnicity	Any science	Survey science	Biology	AP/honors biology	Chemistry	AP chemistry	Physics	AP/honors physics
1982 graduates								
White	96.9 (0.3)	61.6 (1.4)	78.6 (1.0)	10.9 (0.7)	34.4 (0.9)	3.3 (0.5)	16.5 (0.6)	1.2 (0.2)
Asian/Pacific Islander	95.9 (1.3)	40.9 (5.1)	83.7 (2.2)	17.5 (2.9)	52.8 (4.4)	5.8 (1.3)	34.8 (3.4)	3.4 (1.0)
Black	97.1 (0.5)	67.8 (1.8)	73.0 (1.9)	6.0 (1.3)	22.3 (1.5)	1.6 (0.6)	7.6 (0.8)	0.9 (0.4)
Hispanic	93.5 (1.1)	63.3 (1.6)	68.6 (2.1)	4.8 (0.7)	15.6 (1.0)	1.4 (0.4)	5.6 (0.6)	0.4 (0.1)
Native American	91.6 (4.9)	58.1 (7.7)	67.4 (7.0)	3.2 (1.8)	26.2 (7.0)	0.9 (0.9)	8.2 (3.1)	0.0 (0.0)
1987 graduates								
White	99.2 (0.2)	60.7 (3.6)	88.8 (1.1)	9.6 (0.9)	46.7 (1.2)	3.4 (0.4)	20.6 (1.0)	1.7 (0.3)
Asian/Pacific Islander	99.6 (0.3)	44.8 (5.2)	92.1 (1.3)	23.6 (4.4)	70.2 (3.7)	15.4 (2.5)	46.9 (4.2)	6.2 (1.4)
Black	99.0 (0.3)	71.8 (3.8)	84.6 (1.8)	5.2 (0.7)	28.4 (1.8)	1.1 (0.3)	9.7 (1.1)	0.4 (0.1)
Hispanic	99.1 (0.3)	66.9 (3.2)	85.5 (1.5)	7.6 (1.1)	29.1 (1.5)	2.2 (0.6)	9.9 (1.1)	0.8 (0.3)
Native American	99.1 (0.7)	67.3 (3.3)	90.9 (1.9)	13.0 (3.6)	26.4 (2.0)	0.6 (0.3)	8.4 (2.4)	1.4 (0.5)
1990 graduates								
White	99.4 (0.2)	67.6 (2.0)	91.3 (1.1)	10.5 (1.0)	51.4 (1.4)	3.7 (0.6)	23.1 (0.9)	2.1 (0.4)
Asian/Pacific Islander	99.6 (0.2)	56.7 (7.1)	90.4 (2.7)	13.4 (4.0)	63.6 (4.0)	7.7 (1.9)	38.4 (3.5)	5.9 (2.6)
Black	99.5 (0.2)	75.3 (3.1)	91.1 (2.2)	7.7 (1.9)	40.0 (2.2)	2.5 (0.9)	14.5 (1.9)	0.7 (0.3)
Hispanic	99.1 (0.3)	72.0 (3.5)	90.1 (1.4)	6.7 (1.3)	38.1 (2.9)	1.1 (0.4)	13.2 (1.3)	1.0 (0.4)
Native American	98.7 (1.2)	69.4 (5.8)	89.4 (4.7)	3.8 (2.0)	34.9 (4.6)	4.4 (2.6)	14.5 (3.8)	0.5 (0.5)
1994 graduates								
White	99.8 (0.1)	72.4 (2.3)	94.2 (1.2)	12.4 (1.1)	58.2 (1.1)	4.3 (0.6)	26.1 (1.0)	2.7 (0.4)
Asian/Pacific Islander	99.4 (0.4)	62.0 (4.5)	91.5 (1.4)	18.2 (3.1)	69.2 (4.8)	7.7 (1.5)	44.4 (3.7)	6.7 (1.5)
Black	99.8 (0.1)	71.7 (3.7)	91.8 (2.1)	7.7 (1.0)	43.7 (2.7)	2.1 (0.7)	15.0 (1.2)	1.8 (0.4)
Hispanic	99.3 (0.2)	69.7 (3.1)	93.7 (0.6)	11.0 (1.1)	46.0 (2.8)	2.5 (0.6)	16.1 (1.4)	1.9 (0.5)
Native American	99.7 (0.3)	79.0 (5.1)	91.8 (2.1)	6.2 (2.9)	41.3 (5.4)	0.6 (0.6)	10.3 (2.8)	0.3 (0.3)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates*, NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-2.

Science & Engineering Indicators – 1998

Appendix table 1-3.
Trends in average scale scores on the National Assessment of Educational Progress in science, by age, sex, and race/ethnicity: 1969-96, selected years

	All students	Males	Females	Difference, male vs. female	Whites	Blacks	Difference, white vs. black	Hispanics	Difference, white vs. Hispanic
Age 9									
1970	225 (1.2)	228 (1.3)	223 (1.2)	5 (1.8)	236 (0.9)	179 (1.9)	57 (2.1)	NA	NA
1973	220 (1.2)	223 (1.3)	218 (1.2)	4 (1.8)	231 (0.9)	177 (1.9)	55 (2.1)	NA	NA
1977	220 (1.2)	222 (1.3)	218 (1.2)	5 (1.8)	230 (0.9)	175 (1.8)	55 (2.0)	192 (2.7)	38 (2.8)
1982	221 (1.8)	221 (2.3)	221 (2.0)	0 (3.0)	229 (1.9)	187 (3.0)	42 (3.6)	189 (4.2)	40 (4.6)
1986	224 (1.2)	227 (1.4)	221 (1.4)	6 (2.0)	232 (1.2)	196 (1.9)	36 (2.2)	199 (3.1)	33 (3.3)
1990	229 (0.8)	230 (1.1)	227 (1.0)	3 (1.5)	238 (0.8)	196 (2.0)	41 (2.1)	206 (2.2)	31 (2.4)
1992	231 (1.0)	235 (1.2)	227 (1.0)	8 (1.6)	239 (1.0)	200 (2.7)	39 (2.9)	205 (2.8)	34 (3.0)
1994	231 (1.2)	232 (1.3)	230 (1.4)	2 (1.9)	240 (1.3)	201 (1.7)	39 (2.2)	201 (2.7)	39 (3.0)
1996	230 (1.2)	232 (1.8)	228 (1.4)	4* (2.3)	239 (1.4)	201 (2.6)	38 (3.0)	207 (2.5)	33 (2.9)
Age 13									
1970	255 (1.1)	257 (1.3)	253 (1.2)	4 (1.8)	263 (0.8)	215 (2.4)	49 (2.5)	NA	NA
1973	250 (1.1)	252 (1.3)	247 (1.2)	5 (1.8)	259 (0.8)	205 (2.4)	53 (2.5)	NA	NA
1977	247 (1.1)	251 (1.3)	244 (1.2)	7 (1.7)	256 (0.8)	208 (2.4)	48 (2.5)	213 (1.9)	43 (2.1)
1982	250 (1.3)	256 (1.5)	245 (1.3)	11 (2.0)	257 (1.1)	217 (1.3)	40 (1.7)	226 (3.9)	32 (4.0)
1986	251 (1.4)	256 (1.6)	247 (1.5)	9 (2.2)	259 (1.4)	222 (2.5)	38 (2.9)	226 (3.1)	33 (3.4)
1990	255 (0.9)	259 (1.1)	252 (1.1)	7 (1.6)	264 (0.9)	226 (3.1)	38 (3.2)	232 (2.6)	33 (2.7)
1992	258 (0.8)	260 (1.2)	256 (1.0)	4 (1.6)	267 (1.0)	224 (2.7)	43 (2.9)	238 (2.6)	30 (2.8)
1994	257 (1.0)	259 (1.2)	254 (1.2)	5 (1.7)	267 (1.0)	224 (4.2)	43 (4.3)	232 (2.4)	34 (2.6)
1996	256 (1.0)	261 (1.1)	252 (1.3)	9* (1.7)	266 (1.2)	226 (2.2)	40 (2.5)	232 (2.5)	34 (2.7)
Age 17									
1969	305 (1.0)	314 (1.2)	297 (1.1)	17 (1.6)	312 (0.8)	258 (1.5)	54 (1.7)	NA	NA
1973	296 (1.0)	304 (1.2)	288 (1.1)	16 (1.6)	304 (0.8)	250 (1.5)	54 (1.7)	NA	NA
1977	290 (1.0)	297 (1.2)	282 (1.1)	15 (1.6)	298 (0.7)	240 (1.5)	57 (1.7)	262 (2.2)	35 (2.3)
1982	283 (1.2)	292 (1.4)	275 (1.3)	17 (1.9)	293 (1.0)	235 (1.7)	58 (2.0)	249 (2.3)	44 (2.5)
1986	289 (1.4)	295 (1.9)	282 (1.5)	13 (2.4)	298 (1.7)	253 (2.9)	45 (3.3)	259 (3.8)	38 (4.1)
1990	290 (1.1)	296 (1.3)	285 (1.6)	10 (2.1)	301 (1.1)	253 (4.5)	48 (4.6)	262 (4.4)	40 (4.5)
1992	294 (1.3)	299 (1.7)	289 (1.5)	19 (2.2)	304 (1.3)	256 (3.2)	48 (3.5)	270 (5.6)	34 (5.8)
1994	294 (1.6)	300 (2.0)	289 (1.7)	11 (2.6)	306 (1.5)	257 (3.1)	49 (3.5)	261 (6.7)	45 (6.9)
1996	296 (1.2)	300 (1.7)	292 (1.4)	8 (2.2)	307 (1.2)	260 (2.3)	47 (2.6)	269 (3.0)	38* (3.2)

* = average scale score difference in 1996 is significantly lower than in first year listed; NA = not available

NOTES: Scale scores range from 0 to 300 for every grade level. Standard errors are shown in parentheses.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey. *NAEP 1994: Trends in Academic Progress* (Washington, DC: National Center for Education Statistics, 1996).

See figure 1-3.

Appendix table 1-4.
Grade 8 average scale scores on the National Assessment of Educational Progress in science, by state and race/ethnicity: 1996

State	All students		White		Asian/Pacific Islander		Black		Hispanic		Native American		
	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students	
Nation	148 (0.9)	100.0	159 (1.1)	68 (0.4)	150 (3.3)	2 (0.3)	120 (1.2)	15 (0.3)	127 (1.8)	12 (0.3)	148 (4.2)	2 (0.3)	
Alabama	139 (1.6)	100.0	151 (1.5)	61 (1.9)	NA	*	117 (1.8)	33 (1.9)	107 (7.6)	4 (0.4)	NA	NA	
Alaska	153 (1.3)	100.0	162 (1.2)	66 (1.6)	152 (3.8)	7 (1.0)	NA	4 (0.6)	137 (4.6)	7 (0.8)	129 (3.4)	16 (1.4)	
Arizona	145 (1.6)	100.0	157 (1.3)	57 (1.9)	NA	*	124 (3.3)	4 (0.6)	129 (2.1)	31 (1.6)	121 (8.6)	6 (1.5)	
Arkansas	144 (1.3)	100.0	154 (1.5)	73 (1.9)	NA	*	116 (2.5)	20 (1.7)	122 (5.8)	4 (0.6)	NA	NA	
California	138 (1.7)	100.0	156 (1.7)	38 (2.1)	148 (3.6)	13 (1.4)	121 (3.4)	7 (1.0)	121 (1.9)	39 (1.8)	NA	NA	
Colorado	155 (0.9)	100.0	162 (0.8)	70 (1.3)	155 (4.8)	3 (0.5)	142 (2.2)	5 (0.8)	135 (2.3)	20 (1.2)	142 (4.3)	3 (0.4)	
Connecticut	155 (1.3)	100.0	165 (1.0)	75 (1.4)	163 (3.7)	3 (0.4)	121 (4.4)	10 (1.3)	122 (2.6)	11 (0.9)	NA	NA	
Delaware	142 (0.8)	100.0	152 (0.8)	64 (1.2)	NA	*	122 (1.8)	26 (1.0)	116 (4.1)	7 (0.7)	NA	NA	
Florida	142 (1.6)	100.0	155 (1.5)	55 (2.1)	NA	*	119 (2.7)	20 (2.0)	129 (2.2)	22 (2.0)	NA	NA	
Georgia	142 (1.4)	100.0	155 (1.2)	56 (2.3)	NA	*	122 (1.4)	36 (2.4)	128 (4.2)	5 (0.4)	NA	NA	
Hawaii	135 (0.7)	100.0	146 (1.8)	17 (0.7)	138 (1.1)	54 (1.3)	128 (4.4)	3 (0.4)	121 (1.8)	22 (0.8)	NA	NA	
Indiana	153 (1.4)	100.0	158 (1.3)	81 (1.8)	NA	*	125 (3.3)	11 (1.4)	139 (2.1)	5 (0.7)	NA	NA	
Iowa	158 (1.2)	100.0	160 (1.1)	91 (1.0)	NA	*	131 (3.6)	3 (0.6)	140 (4.6)	3 (0.5)	NA	NA	
Kentucky	147 (1.2)	100.0	151 (1.1)	86 (0.9)	NA	*	127 (2.7)	9 (0.8)	113 (6.2)	3 (0.4)	NA	NA	
Louisiana	132 (1.6)	100.0	148 (1.3)	55 (1.8)	NA	*	113 (2.1)	37 (1.7)	104 (5.7)	6 (0.6)	NA	NA	
Maine	163 (1.0)	100.0	164 (0.9)	92 (0.7)	NA	*	NA	1 (0.2)	141 (4.6)	3 (0.5)	NA	NA	
Maryland	145 (1.5)	100.0	160 (1.4)	56 (2.0)	161 (3.6)	4 (0.6)	124 (1.4)	32 (2.1)	121 (4.1)	6 (0.6)	NA	NA	
Massachusetts	157 (1.4)	100.0	163 (1.2)	81 (1.7)	152 (7.3)	4 (0.8)	126 (3.3)	6 (1.0)	126 (3.9)	8 (0.7)	NA	NA	
Michigan	153 (1.4)	100.0	161 (1.4)	76 (2.0)	NA	*	122 (2.4)	15 (1.9)	134 (4.9)	4 (0.4)	NA	NA	
Minnesota	159 (1.3)	100.0	162 (1.2)	86 (1.9)	152 (9.7)	4 (0.9)	130 (4.4)	4 (0.8)	134 (5.3)	4 (0.6)	NA	NA	
Mississippi	133 (1.4)	100.0	149 (1.2)	50 (2.1)	NA	*	119 (1.4)	44 (1.9)	105 (3.8)	6 (0.6)	NA	NA	
Missouri	151 (1.2)	100.0	158 (1.0)	78 (1.5)	NA	*	120 (2.8)	13 (1.3)	130 (5.0)	5 (0.6)	NA	NA	
Montana	162 (1.2)	100.0	166 (1.0)	83 (1.9)	NA	*	126 (3.3)	6 (1.0)	126 (3.9)	8 (0.7)	NA	NA	
Nebraska	157 (1.0)	100.0	161 (0.9)	85 (1.2)	NA	*	122 (2.4)	15 (1.9)	134 (4.9)	4 (0.4)	NA	NA	
New Mexico	141 (1.0)	100.0	159 (1.0)	38 (1.5)	NA	*	130 (4.4)	4 (0.8)	134 (5.3)	4 (0.6)	NA	NA	
New York	146 (1.6)	100.0	161 (1.4)	60 (2.6)	155 (5.4)	5 (0.9)	119 (1.4)	44 (1.9)	105 (3.8)	6 (0.6)	NA	NA	
North Carolina	147 (1.2)	100.0	157 (1.1)	65 (2.0)	NA	*	126 (1.4)	27 (1.3)	123 (3.6)	4 (0.5)	136 (4.1)	3 (1.4)	
North Dakota	162 (0.8)	100.0	164 (0.8)	92 (0.8)	NA	*	1 (0.2)	147 (2.7)	5 (1.0)	139 (2.7)	10 (1.7)	NA	NA
Oregon	155 (1.6)	100.0	158 (1.4)	82 (1.5)	157 (3.3)	4 (0.5)	130 (3.1)	5 (0.6)	134 (3.1)	7 (0.9)	NA	NA	
Rhode Island	149 (0.8)	100.0	155 (0.9)	77 (0.8)	142 (3.1)	4 (0.4)	130 (2.8)	5 (0.4)	130 (1.1)	51 (1.5)	126 (2.4)	8 (0.6)	
South Carolina	139 (1.5)	100.0	153 (1.6)	51 (1.9)	NA	*	122 (1.6)	40 (1.9)	122 (4.1)	6 (0.6)	NA	NA	
Tennessee	143 (1.8)	100.0	151 (1.7)	77 (1.5)	NA	*	117 (3.1)	17 (1.5)	104 (6.2)	3 (0.5)	NA	NA	
Texas	145 (1.8)	100.0	161 (1.2)	48 (1.9)	157 (3.6)	3 (0.5)	127 (2.4)	12 (1.3)	129 (2.7)	36 (2.1)	NA	NA	
Utah	156 (0.8)	100.0	159 (0.7)	87 (1.0)	143 (3.2)	3 (0.4)	130 (2.8)	5 (0.5)	118 (1.8)	12 (0.5)	NA	NA	
Vermont	157 (1.0)	100.0	159 (0.9)	90 (0.9)	NA	*	1 (0.3)	118 (1.8)	12 (1.0)	NA	NA	NA	
Virginia	149 (1.6)	100.0	158 (1.4)	64 (2.0)	165 (3.2)	5 (0.6)	126 (2.3)	24 (1.9)	132 (4.2)	5 (0.6)	NA	NA	
Washington	150 (1.3)	100.0	156 (1.1)	74 (1.9)	149 (3.3)	7 (0.9)	127 (4.2)	4 (0.7)	125 (3.5)	10 (1.1)	130 (4.3)	4 (0.6)	
West Virginia	147 (0.9)	100.0	149 (0.9)	90 (0.7)	NA	*	127 (3.2)	4 (0.5)	122 (4.3)	3 (0.3)	NA	NA	
Wisconsin	160 (1.7)	100.0	165 (1.1)	83 (1.5)	NA	*	115 (5.3)	6 (1.1)	141 (4.6)	6 (0.7)	NA	NA	
Wyoming	158 (0.6)	100.0	161 (0.6)	84 (0.8)	NA	*	1 (0.2)	140 (1.9)	11 (0.6)	138 (2.5)	4 (0.4)	NA	NA

* = sample size insufficient to permit reliable estimates; NA = not available

NOTES: Scale scores range from 0 to 300. Idaho, Illinois, Kansas, Nevada, New Hampshire, New Jersey, Ohio, Oklahoma, Pennsylvania, and South Dakota did not participate in the assessment. Standard errors are shown in parentheses. National results are based on the national assessment samples, not on aggregated state assessment program samples.

SOURCE: C. O'Sullivan, C. Reese, and J. Mazzeo, *NAEP 1996 Science Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, 1997).

See figure 1-4.

Science & Engineering Indicators - 1998

Appendix table 1-5.

**Overall mean and average percentage correct on grade 4 TIMSS science assessment,
by country and content area: 1994-95**

Country	Mean	All science content areas	Earth science	Life science	Physical science	Environmental issues/nature of science
All countries	524	59 (0.1)	57 (0.1)	64 (0.1)	57 (0.2)	51 (0.2)
Australia	562 (2.9)	66 (0.5)	61 (0.6)	72 (0.5)	63 (0.7)	63 (0.8)
Austria	565 (3.3)	66 (0.7)	62 (0.8)	72 (0.7)	64 (0.8)	54 (1.0)
Canada	549 (3.0)	64 (0.6)	62 (0.6)	68 (0.6)	61 (0.7)	56 (0.7)
Cyprus	475 (3.3)	51 (0.5)	48 (0.7)	55 (0.5)	50 (0.7)	42 (1.0)
Czech Republic	557 (3.1)	65 (0.5)	64 (0.6)	71 (0.5)	62 (0.7)	56 (0.9)
England and Wales	551 (3.3)	63 (0.6)	61 (0.6)	68 (0.6)	60 (0.8)	56 (1.0)
Greece	497 (4.1)	54 (0.8)	52 (0.9)	61 (0.9)	49 (0.9)	43 (1.2)
Hong Kong	533 (3.7)	62 (0.7)	61 (0.6)	68 (0.7)	60 (0.8)	50 (1.1)
Hungary	532 (3.4)	62 (0.6)	62 (0.7)	66 (0.6)	59 (0.8)	50 (0.9)
Iceland	505 (3.3)	55 (0.7)	55 (0.7)	60 (0.8)	52 (0.7)	47 (1.2)
Iran	416 (3.9)	40 (0.7)	38 (0.7)	44 (0.7)	40 (0.9)	26 (0.9)
Ireland	539 (3.3)	61 (0.6)	60 (0.8)	66 (0.6)	57 (0.7)	55 (0.9)
Israel	505 (3.6)	57 (0.8)	51 (0.8)	61 (0.9)	55 (0.9)	51 (1.3)
Japan	574 (1.8)	70 (0.3)	66 (0.4)	73 (0.3)	70 (0.4)	62 (0.6)
Kuwait	401 (3.1)	39 (0.5)	36 (0.6)	45 (0.6)	37 (0.5)	25 (0.7)
Latvia	512 (4.9)	56 (0.8)	57 (1.0)	60 (0.8)	54 (0.9)	46 (1.2)
Netherlands	557 (3.1)	67 (0.5)	61 (0.6)	73 (0.5)	65 (0.6)	61 (0.9)
New Zealand	531 (4.9)	60 (0.9)	57 (0.9)	66 (0.9)	57 (1.1)	54 (1.2)
Norway	530 (3.6)	60 (0.6)	60 (0.6)	67 (0.7)	55 (0.7)	53 (0.9)
Portugal	480 (4.0)	50 (0.7)	50 (0.8)	54 (0.8)	49 (0.9)	39 (1.0)
Scotland	536 (4.2)	60 (0.8)	58 (0.9)	65 (0.8)	57 (0.8)	53 (1.2)
Singapore	547 (5.0)	64 (0.8)	58 (0.8)	70 (0.8)	64 (0.8)	53 (1.1)
Slovenia	546 (3.3)	64 (0.7)	64 (0.7)	68 (0.7)	61 (0.8)	54 (0.8)
South Korea	597 (1.9)	74 (0.4)	72 (0.5)	76 (0.4)	75 (0.5)	70 (0.8)
Thailand	473 (4.9)	49 (0.9)	48 (0.9)	52 (0.8)	46 (1.0)	48 (1.4)
United States	565 (3.1)	66 (0.5)	64 (0.7)	71 (0.6)	60 (0.6)	65 (0.8)

TIMSS = Third International Mathematics and Science Study

NOTE: Standard errors are shown in parentheses.

SOURCE: M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

See figure 1-5.

Science & Engineering Indicators – 1998

Appendix table 1-6.

**Overall mean and average percentage correct on grade 8 TIMSS science assessment,
by country and content area: 1994-95**

Country	Mean	All science content areas	Earth science	Life science	Physics	Chemistry	Environmental issues/nature of science
All countries	516	56 (0.1)	55 (0.1)	59 (0.1)	55 (0.1)	51 (0.2)	53 (0.2)
Australia	545 (3.9)	60 (0.7)	57 (0.8)	63 (0.8)	60 (0.7)	54 (0.9)	62 (1.0)
Austria	558 (3.7)	61 (0.7)	62 (0.8)	65 (0.7)	62 (0.7)	58 (1.1)	55 (0.9)
Belgium (Flemish)	550 (4.2)	60 (1.1)	62 (1.2)	64 (1.1)	61 (1.1)	51 (1.3)	58 (1.5)
Belgium (French)	471 (2.8)	50 (0.7)	50 (0.9)	55 (0.9)	51 (0.7)	41 (0.8)	46 (1.0)
Bulgaria	565 (5.3)	62 (1.0)	58 (1.2)	64 (1.0)	60 (1.0)	65 (1.7)	59 (1.5)
Canada	531 (2.6)	59 (0.5)	58 (0.6)	62 (0.6)	59 (0.4)	52 (0.7)	61 (0.7)
Colombia	411 (4.1)	39 (0.8)	37 (0.8)	44 (0.9)	37 (0.8)	32 (1.0)	40 (1.1)
Cyprus	463 (1.9)	47 (0.4)	46 (0.6)	49 (0.5)	46 (0.4)	45 (0.6)	46 (0.8)
Czech Republic	574 (4.3)	64 (0.8)	63 (1.2)	69 (0.8)	64 (0.7)	60 (1.2)	59 (1.1)
Denmark	478 (3.1)	51 (0.6)	49 (0.7)	56 (0.7)	53 (0.7)	41 (0.8)	47 (1.0)
England and Wales	552 (3.3)	61 (0.6)	59 (0.8)	64 (0.8)	62 (0.6)	55 (0.8)	65 (1.0)
France	498 (2.5)	54 (0.6)	55 (0.8)	56 (0.8)	54 (0.5)	47 (0.9)	53 (0.9)
Germany	431 (4.8)	58 (1.0)	57 (1.0)	63 (1.1)	57 (1.0)	54 (1.3)	51 (1.3)
Greece	497 (2.2)	52 (0.5)	49 (0.6)	54 (0.6)	53 (0.5)	51 (0.5)	51 (1.0)
Hong Kong	522 (4.7)	58 (1.0)	54 (1.0)	61 (1.0)	58 (0.9)	55 (1.0)	55 (1.3)
Hungary	554 (2.8)	61 (0.6)	60 (0.8)	65 (0.7)	60 (0.6)	60 (0.8)	53 (0.8)
Iceland	494 (4.0)	52 (0.9)	50 (1.2)	58 (1.0)	53 (0.9)	42 (0.8)	49 (1.0)
Iran	470 (2.4)	47 (0.6)	45 (0.6)	49 (0.6)	48 (0.7)	52 (0.8)	39 (1.1)
Ireland	538 (4.5)	58 (0.9)	61 (1.0)	60 (1.1)	56 (0.8)	54 (1.0)	60 (1.1)
Israel	524 (5.7)	57 (1.1)	55 (1.1)	61 (1.1)	57 (1.1)	53 (1.5)	52 (1.6)
Japan	571 (1.6)	65 (0.3)	61 (0.4)	71 (0.4)	67 (0.3)	61 (0.5)	60 (0.7)
Kuwait	430 (3.7)	43 (0.9)	43 (1.0)	45 (1.1)	43 (0.7)	40 (1.5)	39 (1.3)
Latvia	485 (2.7)	50 (0.6)	48 (0.8)	53 (0.7)	51 (0.7)	48 (0.8)	47 (1.0)
Lithuania	476 (3.4)	49 (0.7)	46 (0.9)	52 (0.9)	51 (0.7)	48 (0.9)	40 (1.0)
Netherlands	560 (5.0)	62 (1.0)	61 (1.4)	67 (1.4)	63 (0.9)	52 (0.9)	65 (1.6)
New Zealand	525 (4.4)	58 (0.8)	56 (0.9)	60 (1.0)	58 (0.7)	53 (1.1)	59 (1.2)
Norway	527 (1.9)	58 (0.4)	61 (0.6)	61 (0.5)	57 (0.4)	49 (0.6)	55 (0.8)
Portugal	480 (2.3)	50 (0.6)	50 (0.7)	53 (0.6)	48 (0.5)	50 (0.9)	45 (0.8)
Romania	486 (4.7)	50 (0.8)	49 (1.0)	55 (1.0)	49 (0.8)	46 (1.0)	42 (1.0)
Russian Federation	538 (4.0)	58 (0.8)	58 (0.8)	62 (0.7)	57 (0.9)	57 (1.3)	50 (0.8)
Scotland	517 (5.1)	55 (1.0)	52 (1.0)	57 (1.1)	57 (0.8)	51 (1.3)	57 (1.4)
Singapore	607 (5.5)	70 (1.0)	65 (1.1)	72 (1.0)	69 (0.8)	69 (1.2)	74 (1.1)
Slovak Republic	544 (3.2)	59 (0.6)	60 (0.7)	60 (0.6)	61 (0.6)	57 (0.8)	53 (0.9)
Slovenia	560 (2.5)	62 (0.5)	64 (0.7)	65 (0.6)	61 (0.6)	56 (0.9)	59 (0.9)
South Africa	326 (6.6)	27 (1.3)	26 (1.1)	27 (1.3)	27 (1.4)	26 (1.4)	26 (1.3)
South Korea	565 (1.9)	66 (0.3)	63 (0.5)	70 (0.4)	65 (0.5)	63 (0.6)	64 (0.8)
Spain	517 (1.7)	56 (0.4)	57 (0.5)	58 (0.5)	55 (0.4)	51 (0.7)	53 (0.6)
Sweden	535 (3.0)	59 (0.6)	62 (0.7)	63 (0.7)	57 (0.5)	56 (0.7)	52 (0.8)
Switzerland	522 (2.5)	56 (0.5)	58 (0.6)	59 (0.6)	58 (0.5)	50 (0.7)	51 (0.8)
Thailand	525 (3.7)	57 (0.9)	56 (1.0)	66 (0.9)	54 (0.7)	43 (1.2)	62 (1.1)
United States	534 (4.7)	58 (1.0)	58 (1.0)	63 (1.1)	56 (0.8)	53 (1.2)	61 (1.0)

TIMSS = Third International Mathematics and Science Study

NOTE: Standard errors are shown in parentheses.

SOURCE: A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996).

See figure 1-6.

Science & Engineering Indicators – 1998

Appendix table 1-7.
**Average percentage correct on TIMSS science assessment,
by country, grade, and sex: 1994-95**

Country	Grade 4		Grade 8	
	Boys	Girls	Boys	Girls
Australia	67 (0.6) ^a	65 (0.6)	61 (1.0)	59 (0.8)
Austria	67 (0.9) ^a	64 (0.7)	63 (0.8)	60 (0.8)
Belgium (Flemish)	NP	NP	62 (1.7)	59 (1.5)
Belgium (French)	NP	NP	52 (1.0)	49 (0.7)
Canada	64 (0.7)	63 (0.6)	60 (0.6)	58 (0.6)
Colombia	NP	NP	40 (1.4)	37 (0.8)
Cyprus	51 (0.7)	50 (0.6)	46 (0.4)	47 (0.6)
Czech Republic	67 (0.6) ^a	64 (0.7)	67 (0.8) ^a	61 (1.1)
Denmark	NP	NP	54 (0.6) ^a	48 (0.8)
England and Wales	64 (0.8)	63 (0.6)	63 (1.0)	60 (0.7)
France	NP	NP	55 (0.7) ^a	52 (0.7)
Germany	NP	NP	59 (1.2)	57 (1.0)
Greece	54 (1.0)	53 (1.0)	54 (0.6)	50 (0.6)
Hong Kong	63 (0.8) ^a	61 (0.7)	60 (1.1)	55 (1.1)
Hungary	63 (0.8) ^a	60 (0.7)	63 (0.7)	59 (0.7)
Iceland	56 (0.8) ^a	54 (0.8)	53 (1.2)	51 (0.9)
Iran	41 (1.0)	39 (0.9)	49 (0.8)	45 (0.8)
Ireland	61 (0.7)	61 (0.8)	60 (1.3)	57 (1.0)
Israel	58 (1.1)	57 (0.8)	61 (1.2)	54 (1.1)
Japan	70 (0.4) ^a	69 (0.4)	67 (0.5)	64 (0.4)
Latvia	55 (0.9)	57 (1.0)	52 (0.8)	48 (0.6)
Lithuania	NP	NP	51 (0.8)	47 (0.8)
Netherlands	70 (0.7) ^a	65 (0.7)	64 (1.2)	60 (1.1)
New Zealand	59 (1.2)	61 (0.9)	60 (1.0)	56 (1.0)
Norway	61 (0.8)	60 (0.7)	59 (0.6)	56 (0.4)
Portugal	50 (0.9)	50 (0.8)	52 (0.7)	48 (0.6)
Romania	NP	NP	51 (0.9)	49 (0.9)
Russian Federation	NP	NP	60 (0.9)	57 (0.7)
Scotland	61 (0.9)	60 (0.8)	57 (1.2)	53 (0.9)
Singapore	65 (0.9)	64 (1.0)	71 (1.2)	69 (1.1)
Slovak Republic	NP	NP	62 (0.6)	57 (0.7)
Slovenia	64 (0.7)	63 (0.8)	64 (0.6)	59 (0.7)
South Africa	NP	NP	28 (1.8)	25 (1.2)
South Korea	75 (0.5) ^a	73 (0.5)	67 (0.5)	64 (0.5)
Spain	NP	NP	58 (0.5)	54 (0.5)
Sweden	NP	NP	60 (0.6)	57 (0.6)
Switzerland	NP	NP	58 (0.6)	54 (0.5)
Thailand	49 (1.2)	49 (0.8)	57 (0.9)	58 (1.0)
United States	67 (0.6) ^a	65 (0.6)	59 (1.0)	57 (1.0)

NP = did not participate in grade 4 assessment; TIMSS = Third International Mathematics and Science Study.

NOTE: Standard errors are shown in parentheses.

^aDifference between the sexes is statistically significant at the 0.05 level, adjusted for multiple comparisons.

SOURCES: A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

Appendix table 1-8.
Proportion of high school graduates earning credits in mathematics courses, by sex: 1982, 1987, 1990, and 1994
(Percentages)

Year of graduation and sex	Any mathematics	Basic math	General math	Applied math	Preadgebra	Algebra 1	Algebra 2	Geometry	Calculus	AP calculus	Advanced math—other
1982 graduates											
All	98.6 (0.1)	6.2 (0.5)	29.5 (1.1)	8.8 (0.4)	18.0 (0.8)	54.3 (0.9)	35.6 (0.8)	45.8 (0.8)	4.7 (0.4)	1.5 (0.3)	13.2 (0.8)
Male	98.9 (0.2)	7.4 (0.5)	32.3 (1.2)	10.1 (0.6)	17.5 (1.2)	52.7 (1.0)	35.9 (1.1)	45.4 (0.8)	5.2 (0.5)	1.6 (0.3)	14.8 (1.1)
Female	98.4 (0.2)	5.1 (0.7)	26.9 (1.2)	7.7 (0.6)	18.5 (0.8)	55.8 (1.2)	35.3 (0.9)	46.2 (1.2)	4.2 (0.4)	1.4 (0.3)	11.7 (0.7)
1987 graduates											
All	99.8 (0.1)	8.5 (0.7)	21.1 (1.3)	14.4 (1.0)	18.2 (1.2)	64.1 (1.1)	46.1 (1.6)	59.8 (1.0)	6.0 (0.4)	3.3 (0.4)	20.5 (1.1)
Male	99.8 (0.1)	9.2 (0.8)	23.1 (1.5)	15.3 (1.2)	17.9 (1.2)	62.3 (1.2)	44.8 (1.8)	58.9 (1.2)	7.4 (0.5)	3.8 (0.5)	22.2 (1.3)
Female	99.7 (0.1)	7.8 (0.8)	19.1 (1.1)	13.6 (1.0)	18.4 (1.2)	65.8 (1.1)	47.5 (1.7)	60.5 (1.0)	4.6 (0.4)	2.7 (0.4)	19.0 (1.2)
1990 graduates											
All	99.9 (0.0)	8.0 (0.7)	19.6 (1.5)	16.1 (1.2)	23.3 (1.4)	64.0 (1.6)	49.6 (1.3)	63.2 (1.4)	6.5 (0.5)	4.1 (0.4)	20.3 (1.2)
Male	99.9 (0.1)	8.9 (0.8)	21.6 (1.7)	17.0 (1.3)	23.5 (1.5)	61.4 (1.6)	47.7 (1.4)	62.1 (1.6)	7.5 (0.6)	5.0 (0.6)	21.4 (1.4)
Female	99.9 (0.1)	7.1 (0.7)	17.8 (1.4)	15.2 (1.2)	23.0 (1.4)	66.4 (1.8)	51.5 (1.5)	64.3 (1.4)	5.6 (0.4)	3.4 (0.4)	19.3 (1.1)
1994 graduates											
All	99.9 (0.0)	4.8 (0.5)	16.1 (1.0)	13.7 (1.0)	23.2 (1.0)	66.6 (1.4)	57.9 (1.5)	70.1 (1.4)	9.2 (0.5)	6.9 (0.5)	24.7 (0.8)
Male	99.9 (0.0)	5.7 (0.6)	18.2 (1.1)	14.8 (1.1)	24.4 (1.1)	64.7 (1.5)	54.5 (1.5)	67.9 (1.5)	9.4 (0.6)	7.1 (0.6)	24.0 (1.0)
Female	99.9 (0.0)	3.9 (0.4)	14.2 (1.1)	12.7 (0.9)	22.1 (1.1)	68.4 (1.5)	61.1 (1.6)	72.2 (1.4)	9.1 (0.6)	6.8 (0.5)	25.3 (1.0)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates*, NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-7.

Science & Engineering Indicators – 1998

Appendix table 1-9.
Proportion of high school graduates earning credits in mathematics courses, by race/ethnicity: 1982, 1987, 1990, and 1994
 (Percentage)

Year of graduation and race/ethnicity	Any mathematics	Basic math	General math	Applied math	Preadgebra	Algebra 1	Algebra 2	Geometry	Calculus	AP calculus	Advanced math-other
1982 graduates											
White	98.8 (0.2)	4.5 (0.4)	25.0 (1.1)	7.8 (0.6)	17.3 (0.9)	58.2 (1.0)	39.5 (0.9)	51.3 (1.0)	5.5 (0.4)	1.8 (0.3)	4.2 (0.6)
Asian/Pacific Islander ...	100.0 (0.0)	4.9 (1.6)	17.1 (3.5)	9.6 (2.1)	15.5 (3.4)	55.5 (5.4)	55.8 (4.2)	64.9 (4.7)	12.8 (2.7)	5.5 (1.7)	5.6 (1.8)
Black	99.3 (0.3)	13.6 (2.1)	46.6 (3.1)	13.3 (1.5)	22.3 (2.1)	43.1 (1.8)	24.2 (2.0)	29.3 (1.8)	1.3 (0.4)	0.3 (0.1)	2.7 (0.5)
Hispanic	97.2 (0.5)	9.4 (1.2)	43.2 (2.1)	11.2 (1.2)	18.5 (1.3)	42.6 (1.5)	20.1 (1.4)	25.7 (1.4)	1.7 (0.3)	0.4 (0.1)	3.2 (0.4)
Native American	99.6 (0.5)	7.4 (4.2)	41.4 (5.2)	7.3 (3.3)	22.1 (5.8)	33.6 (6.5)	19.1 (4.5)	33.5 (7.2)	4.0 (2.2)	0.1 (0.1)	5.5 (3.0)
1987 graduates											
White	99.8 (0.1)	6.5 (0.6)	18.1 (1.3)	14.3 (1.3)	16.5 (1.3)	66.2 (1.3)	50.7 (1.6)	63.1 (1.2)	5.7 (0.4)	2.7 (0.3)	4.1 (1.2)
Asian/Pacific Islander ...	100.0 (0.0)	4.9 (1.3)	14.2 (3.1)	9.7 (1.3)	13.4 (2.8)	63.7 (2.5)	66.1 (4.7)	81.4 (2.5)	29.6 (4.1)	23.7 (4.7)	5.1 (1.4)
Black	99.8 (0.1)	17.1 (2.7)	37.9 (2.7)	18.4 (1.8)	23.2 (1.7)	54.6 (1.3)	30.0 (1.7)	42.3 (2.0)	2.2 (0.3)	1.4 (0.3)	2.1 (0.6)
Hispanic	99.9 (0.1)	21.0 (1.9)	29.3 (3.5)	15.6 (1.8)	27.9 (2.1)	53.6 (1.8)	27.6 (2.0)	39.7 (1.7)	3.6 (0.7)	2.6 (0.6)	2.1 (0.7)
Native American	99.3 (0.8)	7.2 (1.6)	37.2 (4.7)	29.9 (4.4)	40.0 (7.6)	61.4 (2.2)	23.8 (2.6)	43.5 (4.0)	0.4 (0.4)	0.4 (0.4)	4.7 (0.9)
1990 graduates											
White	99.9 (0.1)	5.8 (0.6)	17.5 (1.8)	15.0 (1.1)	21.8 (1.6)	64.1 (1.9)	53.1 (1.6)	65.5 (1.5)	6.9 (0.5)	4.2 (0.5)	5.0 (1.4)
Asian/Pacific Islander ...	99.9 (0.2)	8.4 (2.6)	14.7 (1.8)	13.0 (3.5)	16.4 (2.7)	63.3 (3.1)	60.9 (5.0)	70.7 (2.8)	18.5 (3.3)	15.6 (2.8)	2.6 (1.1)
Black	99.9 (0.1)	14.3 (1.9)	28.4 (2.3)	21.3 (2.7)	26.7 (2.3)	64.7 (2.4)	40.6 (2.8)	55.8 (2.6)	2.7 (0.5)	1.2 (0.3)	1.9 (1.0)
Hispanic	99.8 (0.1)	15.3 (2.7)	28.6 (3.0)	19.1 (3.7)	35.3 (3.2)	64.3 (2.7)	35.1 (2.6)	53.2 (2.8)	3.8 (0.7)	3.0 (0.6)	1.6 (0.7)
Native American	100.0 (0.0)	11.1 (3.0)	28.9 (7.0)	20.7 (4.6)	33.8 (6.5)	60.7 (8.5)	47.1 (5.4)	54.8 (3.1)	4.1 (2.7)	2.9 (2.5)	2.9 (1.2)
1994 graduates											
White	99.9 (0.0)	3.7 (0.5)	14.4 (1.2)	13.2 (1.2)	22.2 (1.1)	67.7 (1.6)	61.6 (1.6)	72.4 (1.6)	9.5 (0.6)	7.3 (0.6)	4.6 (1.0)
Asian/Pacific Islander ...	100.0 (0.0)	4.0 (0.9)	17.5 (2.8)	11.4 (3.1)	18.0 (3.5)	63.0 (2.1)	66.2 (5.0)	75.7 (3.8)	23.6 (3.2)	21.1 (2.9)	5.5 (1.6)
Black	100.0 (0.0)	7.3 (1.3)	27.0 (2.9)	17.5 (2.0)	27.3 (2.5)	65.0 (2.8)	44.0 (2.4)	58.2 (3.1)	3.8 (0.6)	2.0 (0.4)	1.5 (0.3)
Hispanic	99.9 (0.1)	8.4 (1.1)	16.2 (1.8)	16.4 (1.7)	34.0 (2.9)	69.9 (1.3)	49.6 (1.8)	68.8 (1.7)	6.0 (0.5)	4.6 (0.5)	3.0 (0.7)
Native American	100.0 (0.0)	5.4 (1.5)	19.1 (3.4)	13.8 (2.9)	39.5 (8.2)	68.9 (4.9)	42.2 (6.8)	60.0 (4.4)	3.8 (1.2)	2.2 (1.4)	2.9 (1.6)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates*, NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-8.

Science & Engineering Indicators – 1998

Appendix table 1-10.

Student achievement levels on the National Assessment of Educational Progress in mathematics, by grade, sex, race/ethnicity, and region: 1990, 1992, and 1996

Student grade, sex race/ethnicity, and region	Percentage at or above level 2			Percentage at or above level 3		
	1990	1992	1996	1990	1992	1996
				Grade 4		
All students	50 (1.4)	59 (1.0)	64 ^{a,b} (1.2)	13 (1.2)	18 (1.0)	21 ^{a,b} (0.9)
Male	51 (1.7)	60 (1.1)	65 (1.6)	13 (1.5)	19 (1.1)	24 (1.1)
Female	49 (1.9)	57 (1.6)	63 (1.6)	12 (1.3)	16 (1.3)	19 (1.1)
White	59 (1.7)	70 (1.2)	76 (1.4)	16 (1.6)	23 (1.4)	28 (1.2)
Asian/Pacific Islander	65 (5.4)	75 (3.2)	73 (5.0)	23 (5.6)	30 (4.5)	26 (5.3)
Black	19 (2.4)	23 (1.8)	32 (3.2)	1 (0.6)	3 (0.7)	5 (1.4)
Hispanic	31 (2.6)	35 (2.1)	41 (2.4)	5 (1.1)	5 (1.1)	8 (1.0)
Native American	44 (8.3)	43 (4.8)	52 (2.7)	5 (2.6)	10 (3.6)	8 (2.5)
Northeast	51 (4.2)	63 (2.7)	70 (2.9)	14 (3.4)	23 (2.5)	26 (1.6)
Southeast	40 (2.9)	48 (2.2)	55 (2.9)	8 (1.6)	11 (1.2)	16 (2.4)
Central	55 (2.7)	66 (2.8)	75 (2.6)	14 (1.6)	21 (1.7)	27 (2.1)
West	54 (3.2)	59 (2.1)	58 (2.8)	15 (2.3)	17 (2.2)	18 (1.7)
Grade 8						
All students	52 (1.4)	58 (1.1)	62 ^{a,b} (1.1)	15 (1.1)	21 (1.0)	24 ^a (1.1)
Male	52 (1.9)	57 (1.4)	62 (1.7)	17 (1.5)	21 (1.3)	25 (1.5)
Female	52 (1.5)	58 (1.4)	63 (1.3)	14 (1.1)	21 (1.2)	23 (1.2)
White	61 (1.6)	69 (1.3)	74 (1.3)	19 (1.3)	27 (1.2)	31 (1.4)
Asian/Pacific Islander	71 (5.8)	76 (4.6)	— —	32 (5.8)	40 (6.8)	— —
Black	22 (2.4)	21 (2.0)	28 (2.8)	5 (1.0)	2 (0.7)	4 (0.9)
Hispanic	32 (3.1)	34 (1.9)	39 (2.5)	5 (1.3)	6 (0.8)	9 (1.6)
Native American	33 (10.2)	39 (5.8)	51 (6.2)	6 —	7 (3.1)	13 (5.0)
Northeast	59 (4.0)	57 (3.5)	67 (3.1)	20 (2.7)	23 (2.5)	27 (3.7)
Southeast	43 (2.6)	50 (1.8)	56 (3.2)	12 (2.1)	15 (1.2)	18 (1.8)
Central	57 (2.5)	66 (2.7)	69 (3.4)	15 (1.3)	25 (2.4)	29 (2.5)
West	50 (2.6)	58 (2.5)	59 (2.2)	15 (2.1)	21 (1.9)	22 (1.9)
Grade 12						
All students	58 (1.6)	64 (1.1)	69 ^{a,b} (1.3)	12 (0.9)	15 (0.8)	16 ^a (1.1)
Male	60 (1.8)	65 (1.3)	70 (1.4)	15 (1.4)	17 (1.0)	18 (1.3)
Female	56 (1.8)	63 (1.3)	69 (1.5)	9 (0.9)	13 (1.0)	14 (1.2)
White	66 (1.8)	72 (1.3)	79 (1.3)	14 (1.1)	18 (0.9)	20 (1.3)
Asian/Pacific Islander	75 (5.8)	81 (4.3)	81 (4.3)	23 (7.1)	30 (5.6)	33 (6.3)
Black	27 (2.7)	34 (2.6)	38 (3.3)	2 (0.8)	2 (0.5)	4 (1.0)
Hispanic	36 (3.9)	45 (2.0)	50 (3.6)	4 (1.1)	6 (0.9)	6 (1.1)
Native American	— —	— —	34 (16.0)	— —	— —	3 †
Northeast	64 (3.1)	66 (2.0)	72 (2.9)	16 (1.9)	18 (1.5)	21 (2.1)
Southeast	47 (3.9)	55 (2.1)	58 (2.6)	6 (0.8)	10 (1.1)	11 (1.5)
Central	62 (3.5)	70 (2.6)	77 (3.6)	13 (1.7)	17 (1.4)	20 (2.8)
West	57 (3.2)	64 (1.7)	69 (2.4)	12 (2.5)	14 (1.6)	14 (1.7)

— = results omitted by source; † = standard error estimate cannot be accurately determined

NOTES: At grade 4, level 2 performance corresponds to average scale scores of 214-248 and level 3 to scores of 249-281. At grade 8, level 2 corresponds to scores of 262-298 and level 3 to scores of 299-332. At grade 12, level 2 corresponds to scores of 288-335 and level 3 to scores of 336-366. Significance levels are reported here only by grade. Race/ethnicity data are based only on those students who indicated their race/ethnicity. Standard errors are shown in parentheses.

^aStatistically significant difference from 1990.^bStatistically significant difference from 1992.

SOURCE: C. Reese, K. Miller, J. Mazzeo, and J. Dossey, *NAEP 1996 Mathematics Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, 1997).

See figure 1-10.

Science & Engineering Indicators – 1998

Appendix table 1-11.

**Grade 8 student achievement levels on the National Assessment of Educational Progress in mathematics,
by state and race/ethnicity: 1990, 1992, and 1996**

State	Percentage of all students:		Percentage of white students:		Percentage of black students:		Percentage of Hispanic students:	
	At or above level 3	At or above level 2	At or above level 3	At or above level 2	At or above level 3	At or above level 2	At or above level 3	At or above level 2
1990								
Nation	19 1.2	57 1.4	24 1.6	67 1.6	6 1.3	27 3.1	6 1.6	36 3.1
Alabama	12 0.8	47 1.6	16 1.1	59 1.6	3 0.7	23 2.3	4 1.8	20 4.4
Arizona	16 1.1	55 1.8	23 1.5	69 1.6	6 3.2	35 5.3	5 1.0	34 2.4
Arkansas	12 1.0	51 1.3	16 1.2	63 1.6	1 0.6	19 1.1	4 2.8	21 6.3
California	16 1.3	51 1.6	24 2.1	68 1.9	3 1.8	23 3.1	4 0.9	30 2.2
Colorado	22 1.0	64 1.1	27 1.4	73 1.2	2 1.7	28 6.8	6 1.5	40 2.4
Connecticut	26 1.1	66 1.3	31 1.3	75 1.2	5 2.0	33 3.6	5 2.2	30 3.3
Delaware	19 0.9	55 1.3	24 1.2	63 2.0	6 1.2	34 2.2	8 3.5	35 6.7
Florida	15 0.1	49 1.4	19 1.5	61 1.9	3 0.9	22 2.0	10 1.5	37 3.1
Georgia	17 1.3	53 1.5	25 1.8	68 1.6	5 0.8	30 2.0	5 2.2	26 3.7
Hawaii	14 0.8	45 1.0	20 2.7	58 2.6	*	*	5 1.6	23 3.5
Idaho	23 1.4	70 1.2	25 1.6	73 1.3	*	*	7 2.7	42 4.9
Indiana	21 1.2	63 1.6	23 1.2	68 1.5	3 1.4	31 4.5	10 2.8	33 4.7
Iowa	30 1.5	76 1.1	32 1.7	78 1.1	*	*	11 3.6	48 5.7
Kentucky	14 0.9	51 1.8	15 1.1	54 2.0	3 1.5	31 3.5	1 1.2	18 4.6
Louisiana	8 1.0	39 1.7	12 1.6	54 2.0	2 0.5	18 1.9	3 1.6	19 4.1
Maryland	20 1.2	56 1.7	27 1.6	70 1.9	5 1.1	29 2.6	8 1.8	30 3.4
Michigan	20 1.4	60 1.4	24 1.5	69 1.4	1 0.9	18 1.8	6 2.7	35 4.2
Minnesota	29 1.2	74 1.3	30 1.3	77 1.2	10 3.4	30 6.0	6 2.6	33 7.4
Nebraska	30 1.4	74 1.1	33 1.5	79 1.2	4 3.4	25 5.2	6 2.9	49 6.8
New Hampshire	25 1.2	71 1.6	26 1.2	72 1.6	*	*	11 4.6	48 7.4
New Jersey	25 1.3	65 1.6	31 1.9	77 1.7	6 1.4	31 2.6	7 1.7	33 2.7
New Mexico	13 0.9	51 1.3	23 2.0	72 1.7	*	*	5 0.8	38 1.8
New York	19 1.0	57 1.7	26 1.5	72 1.3	4 1.1	26 4.1	6 1.9	30 4.3
North Carolina	11 0.8	44 1.4	16 1.2	58 1.9	3 0.9	23 1.9	1 1.0	12 3.9
North Dakota	34 2.0	81 1.6	36 2.0	85 1.3	*	*	8 4.5	42 7.5
Ohio	19 1.2	60 1.4	21 1.2	66 1.4	2 1.2	22 3.2	6 3.0	28 7.2
Oklahoma	17 1.3	59 1.6	20 1.5	66 1.8	2 1.1	25 3.0	6 2.5	40 5.8
Pennsylvania	21 1.5	63 2.0	25 1.3	70 1.3	3 2.5	29 4.6	4 2.0	20 4.3
Rhode Island	18 1.0	55 0.9	21 1.2	61 1.0	2 1.4	20 4.2	2 0.9	21 3.7
Texas	16 1.0	52 1.7	26 1.8	71 1.7	3 1.0	23 2.6	6 0.9	36 2.1
Virginia	21 1.6	58 1.6	25 2.0	67 1.7	5 1.1	32 2.5	10 3.7	34 5.0
West Virginia	12 0.9	49 1.2	13 0.9	51 1.2	4 3.3	23 6.1	5 2.7	24 5.3
Wisconsin	29 1.5	72 1.7	32 1.6	79 1.5	4 2.1	24 6.1	8 2.7	42 5.7
Wyoming	24 1.0	71 1.3	26 1.1	74 1.3	*	*	10 2.7	50 3.5

Appendix table 1-11.

**Grade 8 student achievement levels on the National Assessment of Educational Progress in mathematics,
by state and race/ethnicity: 1990, 1992, and 1996**

State	Percentage of all students:		Percentage of white students:		Percentage of black students:		Percentage of Hispanic students:	
	At or above level 3	At or above level 2	At or above level 3	At or above level 2	At or above level 3	At or above level 2	At or above level 3	At or above level 2
1992								
Nation	23 1.1	61 1.2	30 1.4	73 1.4	3 0.8	26 2.2	7 0.9	37 2.1
Alabama	12 1.1	44 2.0	19 1.5	59 2.1	1 0.4	19 2.1	1 1.4	15 4.6
Arizona	19 1.4	61 1.8	26 1.8	74 1.7	6 2.9	42 7.8	7 1.4	40 3.6
Arkansas	13 1.0	50 1.7	17 1.1	61 1.8	2 0.9	18 2.2	5 1.6	23 4.7
California	20 1.4	55 2.0	30 2.2	73 2.1	3 1.4	26 5.0	6 1.1	34 2.2
Colorado	26 1.3	69 1.3	31 1.5	77 1.2	6 2.8	33 5.8	10 1.3	48 2.6
Connecticut	30 1.1	69 1.4	38 1.3	81 1.2	5 1.3	32 4.8	6 1.4	32 3.1
Delaware	18 1.1	57 1.2	25 1.5	69 1.5	4 1.2	31 2.7	5 2.8	33 3.7
Florida	18 1.3	55 1.9	26 1.8	70 1.8	4 0.9	27 2.7	7 1.4	40 4.3
Georgia	16 1.0	53 1.5	23 1.6	69 1.8	4 0.9	29 2.1	5 2.7	27 8.6
Hawaii	16 0.8	51 1.2	22 2.4	62 2.4	*	*	5 1.4	34 3.5
Idaho	27 1.2	73 1.1	29 1.2	76 1.1	*	*	9 2.2	46 4.5
Indiana	24 1.3	66 1.5	27 1.5	70 1.6	5 1.9	34 3.9	11 3.8	46 8.0
Iowa	37 1.4	81 1.2	39 1.4	83 1.3	*	*	15 3.4	53 5.7
Kentucky	17 1.1	57 1.3	18 1.2	61 1.3	5 1.7	30 3.9	5 3.0	26 6.2
Louisiana	10 1.2	42 2.0	16 1.7	59 2.3	2 0.6	22 2.2	2 1.5	21 3.8
Maine	31 1.9	77 1.3	32 2.0	79 1.2	*	*	*	*
Maryland	24 1.3	59 1.5	34 1.8	74 1.7	4 1.4	30 2.5	6 2.1	33 4.1
Massachusetts	28 1.4	68 1.5	31 1.6	74 1.6	8 2.7	35 5.3	5 1.8	30 4.5
Michigan	23 1.7	63 1.6	29 2.0	75 1.6	2 0.7	22 2.8	11 3.5	44 5.7
Minnesota	37 1.2	79 1.2	39 1.2	81 1.2	*	*	8 2.8	48 6.7
Mississippi	8 0.8	38 1.5	16 1.4	59 1.9	1 0.5	19 1.4	1 0.9	12 3.2
Missouri	24 1.3	68 1.6	27 1.4	75 1.4	4 1.3	30 3.1	11 3.6	38 6.4
Nebraska	32 1.9	75 1.2	35 2.0	81 1.2	2 1.3	25 8.1	12 3.4	47 5.9
New Hampshire	30 1.5	77 1.0	31 1.4	78 1.0	*	*	13 5.6	56 7.1
New Jersey	28 1.4	67 1.8	36 2.0	82 1.3	5 1.4	32 3.8	7 1.9	41 4.3
New Mexico	14 1.0	54 1.4	23 1.8	72 1.6	*	*	6 0.8	40 1.8
New York	24 1.6	62 2.3	32 2.0	78 1.4	4 1.6	25 5.2	8 2.1	38 4.9
North Carolina	15 1.0	53 1.5	20 1.2	63 1.6	4 0.8	29 2.8	7 4.2	28 6.1
North Dakota	36 1.7	82 1.3	37 1.7	84 1.3	*	*	*	*
Ohio	22 1.4	64 2.0	26 1.6	72 2.0	4 1.0	24 3.0	7 2.6	38 5.6
Oklahoma	21 1.2	65 2.0	24 1.2	72 2.2	3 1.1	28 5.2	11 3.6	46 5.4
Pennsylvania	26 1.5	67 1.7	29 1.4	73 1.4	6 4.1	28 5.0	8 3.9	38 5.6
Rhode Island	20 1.3	62 1.2	23 1.5	69 1.4	4 3.3	32 4.9	3 1.4	22 4.3
South Carolina	18 1.1	53 1.2	27 1.7	70 1.2	4 0.9	30 1.6	2 1.2	21 4.0
Tennessee	15 1.2	53 1.8	18 1.4	62 1.5	3 1.0	21 3.1	2 1.8	23 5.8
Texas	21 1.4	58 1.5	32 2.2	76 1.8	7 1.5	33 3.0	8 1.0	40 1.9
Utah	27 1.1	72 1.3	29 1.2	75 1.3	*	*	9 2.1	47 3.9
Virginia	23 1.2	62 1.6	28 1.4	71 1.6	6 1.3	35 3.3	13 4.1	50 4.4
West Virginia	13 0.9	53 1.5	13 1.0	55 1.5	5 2.4	31 6.5	2 1.5	19 6.3
Wisconsin	32 1.4	76 1.9	36 1.4	81 1.5	10 5.2	38 9.2	6 2.2	43 6.7
Wyoming	26 1.0	73 1.3	28 1.1	77 1.1	*	*	11 2.5	53 4.1

Appendix table 1-11.

**Grade 8 student achievement levels on the National Assessment of Educational Progress in mathematics,
by state and race/ethnicity: 1990, 1992, and 1996**

State	Percentage of all students:		Percentage of white students:		Percentage of black students:		Percentage of Hispanic students:	
	At or above level 3	At or above level 2	At or above level 3	At or above level 2	At or above level 3	At or above level 2	At or above level 3	At or above level 2
1996								
Nation	23 (1.1)	61 (1.5)	30 (1.5)	73 (1.5)	4 (0.9)	27 (2.9)	8 (1.6)	37 (2.5)
Alabama	12 (1.8)	45 (2.6)	18 (2.7)	63 (3.2)	1 (0.5)	17 (2.0)	6 (2.6)	23 (5.0)
Alaska	30 (1.6)	68 (2.3)	37 (1.9)	77 (2.2)	*	*	13 (4.9)	44 (8.1)
Arizona	18 (1.2)	57 (1.9)	25 (1.7)	72 (1.8)	5 (2.7)	34 (6.2)	6 (1.1)	35 (2.6)
Arkansas	13 (1.0)	52 (1.8)	17 (1.3)	62 (1.8)	2 (0.9)	17 (2.9)	*	*
California	17 (1.5)	51 (2.1)	28 (2.3)	71 (2.0)	2 †	25 (4.4)	5 (0.8)	32 (2.4)
Colorado	25 (1.3)	67 (1.3)	31 (1.4)	76 (1.2)	8 (3.6)	40 (4.8)	10 (1.5)	43 (3.1)
Connecticut	31 (1.5)	70 (1.4)	37 (1.6)	80 (1.4)	4 (1.5)	29 (3.8)	8 (1.9)	37 (2.5)
Delaware	19 (1.0)	55 (1.3)	24 (1.4)	66 (1.8)	4 (1.2)	27 (4.2)	8 (3.2)	36 (5.5)
Florida	17 (1.3)	54 (2.1)	26 (1.9)	72 (2.3)	3 (1.1)	21 (2.2)	8 (1.6)	39 (2.6)
Georgia	16 (1.8)	51 (2.0)	24 (2.6)	68 (2.1)	3 (0.8)	24 (1.7)	10 (4.2)	36 (6.6)
Hawaii	16 (0.9)	51 (1.5)	22 (3.5)	62 (3.3)	*	*	7 (1.6)	33 (3.1)
Indiana	24 (1.7)	68 (2.0)	27 (1.8)	74 (1.9)	2 (1.0)	31 (4.4)	10 (3.1)	44 (7.6)
Iowa	31 (1.8)	78 (1.4)	33 (1.8)	79 (1.4)	11 (4.1)	38 (6.9)	12 (5.0)	57 (6.3)
Kentucky	16 (1.2)	56 (1.6)	17 (1.3)	60 (1.6)	2 †	31 (4.0)	*	*
Louisiana	7 (1.1)	38 (2.0)	12 (1.6)	56 (1.8)	2 (0.5)	17 (2.0)	2 †	24 (4.6)
Maine	31 (1.7)	77 (1.5)	32 (1.7)	78 (1.6)	*	*	*	*
Maryland	24 (2.3)	57 (2.2)	34 (2.8)	75 (1.9)	4 (1.0)	26 (2.2)	14 (3.7)	36 (5.2)
Massachusetts	28 (1.8)	68 (2.3)	32 (2.1)	75 (2.0)	8 (3.3)	35 (5.4)	5 (2.2)	26 (5.5)
Michigan	28 (1.8)	67 (2.1)	34 (1.9)	77 (1.7)	5 (2.0)	29 (4.6)	12 (4.6)	37 (5.2)
Minnesota	34 (1.8)	75 (1.5)	37 (1.9)	79 (1.4)	6 (3.5)	33 (7.1)	19 (6.4)	49 (7.7)
Mississippi	7 (0.8)	36 (1.3)	13 (1.6)	56 (1.9)	1 (0.3)	16 (1.3)	3 (1.7)	11 (2.9)
Missouri	22 (1.4)	64 (2.0)	25 (1.6)	70 (2.1)	4 (1.7)	26 (4.7)	10 (4.3)	48 (8.2)
Montana	32 (1.5)	75 (1.7)	36 (1.5)	79 (1.5)	*	*	12 (4.1)	52 (6.5)
Nebraska	31 (1.5)	76 (1.1)	34 (1.6)	80 (1.1)	7 (3.3)	40 (4.5)	7 (2.8)	44 (5.6)
New Mexico	14 (1.1)	51 (1.6)	28 (1.8)	72 (2.0)	*	*	6 (1.2)	38 (1.9)
New York	22 (1.5)	61 (2.0)	31 (1.8)	77 (1.8)	4 (1.8)	32 (4.0)	6 (1.4)	30 (3.6)
North Carolina	20 (1.3)	56 (1.8)	28 (1.6)	69 (1.8)	5 (1.0)	31 (2.5)	7 (2.8)	41 (5.6)
North Dakota	33 (1.5)	77 (1.2)	35 (1.5)	80 (1.1)	*	*	13 (4.9)	55 (8.5)
Oregon	26 (1.6)	67 (1.7)	29 (1.7)	70 (1.6)	*	*	13 (3.7)	46 (5.3)
Rhode Island	20 (1.3)	60 (1.6)	24 (1.5)	67 (1.6)	7 (3.6)	31 (5.0)	4 (1.4)	27 (5.8)
South Carolina	14 (1.2)	48 (1.7)	22 (2.1)	65 (2.3)	3 (0.6)	28 (1.9)	4 (2.9)	26 (5.6)
Tennessee	15 (1.3)	53 (1.8)	18 (1.5)	62 (2.1)	3 (1.2)	19 (2.9)	6 (2.7)	32 (8.0)
Texas	21 (1.5)	59 (1.8)	33 (1.8)	78 (1.7)	5 (1.7)	31 (4.3)	8 (1.4)	42 (2.6)
Utah	24 (1.3)	70 (1.5)	27 (1.3)	73 (1.3)	*	*	6 (1.8)	45 (4.4)
Vermont	27 (1.4)	72 (1.7)	29 (1.4)	74 (1.6)	*	*	*	*
Virginia	21 (1.2)	58 (2.0)	28 (1.4)	71 (1.8)	4 (0.8)	26 (3.3)	9 (3.4)	44 (7.3)
Washington	26 (1.2)	67 (1.6)	30 (1.4)	74 (1.5)	5 (2.7)	27 (5.4)	10 (2.8)	36 (4.5)
West Virginia	14 (0.9)	54 (1.6)	15 (0.9)	56 (1.7)	2 †	29 (6.3)	7 (4.2)	30 (6.6)
Wisconsin	32 (2.0)	75 (2.0)	36 (2.0)	82 (1.7)	2 †	19 (4.6)	10 (2.9)	45 (6.1)
Wyoming	22 (1.0)	68 (1.2)	24 (1.0)	72 (1.2)	*	*	8 (1.6)	45 (5.0)

* = sample size insufficient to permit reliable estimates; † = standard error estimate cannot be accurately determined

NOTES: At grade 8, level 2 corresponds to scores of 262-298 and level 3 to scores of 299-332. At grade 12, level 2 corresponds to scores of 288-335 and level 3 to scores of 336-366. Idaho, Illinois, Kansas, Nevada, New Hampshire, New Jersey, Ohio, Oklahoma, Pennsylvania, and South Dakota did not participate in the assessment. Standard errors are shown in parentheses. National results are based on the national assessment samples, not on aggregated state assessment program samples.

SOURCE: C. Reese, K. Miller, J. Mazzeo, and J. Dossey, *NAEP 1996 Mathematics Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, 1997).

See figure 1-11.

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Appendix table 1-12.

**Overall mean and average percentage correct on grade 4 TIMSS mathematics assessment,
by country and content area: 1994-95**

Country	Mean	All mathematics content areas	Whole numbers	Fractions and proportionality	Measurement, estimation, and probability	Data representation, analysis, and probability	Geometry	Patterns, relations, and functions
All countries	529 (5.1)	59 (0.2)	67 (0.2)	49 (0.2)	56 (0.2)	62 (0.2)	64 (0.2)	60 (0.2)
Australia	546 (3.1)	63 (0.6)	67 (0.6)	51 (0.7)	60 (0.7)	67 (0.8)	74 (0.7)	64 (0.9)
Austria	559 (3.1)	65 (0.7)	74 (0.8)	51 (0.8)	69 (0.8)	66 (1.1)	67 (0.8)	64 (1.1)
Canada	532 (3.3)	60 (1.0)	68 (0.9)	48 (1.0)	54 (1.1)	68 (1.4)	72 (1.4)	62 (1.5)
Cyprus	502 (3.1)	54 (0.6)	65 (0.7)	48 (0.7)	48 (0.8)	52 (0.9)	53 (0.9)	55 (1.1)
Czech Republic	567 (3.3)	66 (0.6)	75 (0.6)	53 (0.8)	68 (0.7)	67 (0.9)	71 (0.7)	67 (0.9)
England and Wales	513 (3.2)	57 (0.7)	58 (0.7)	45 (0.8)	52 (0.7)	64 (0.9)	74 (0.8)	55 (1.0)
Greece	592 (4.4)	51 (0.9)	62 (1.0)	42 (1.1)	48 (1.0)	50 (1.2)	53 (1.2)	47 (1.2)
Hong Kong	587 (4.3)	73 (0.9)	79 (0.9)	66 (1.0)	69 (0.9)	76 (1.0)	74 (0.8)	73 (1.2)
Hungary	548 (3.7)	64 (0.8)	76 (0.7)	49 (0.9)	64 (0.9)	60 (1.0)	66 (0.8)	69 (1.1)
Iceland	474 (2.7)	50 (0.8)	56 (0.9)	36 (1.0)	44 (0.9)	58 (1.2)	63 (1.0)	48 (1.4)
Iran	429 (4.0)	38 (0.9)	51 (1.2)	32 (1.0)	36 (0.9)	23 (0.9)	42 (0.9)	40 (1.4)
Ireland	550 (3.4)	63 (0.8)	70 (0.8)	58 (1.0)	56 (0.9)	69 (0.9)	66 (0.8)	64 (1.0)
Israel	531 (3.5)	59 (1.0)	71 (1.0)	48 (1.1)	54 (1.0)	64 (1.2)	62 (1.0)	60 (1.5)
Japan	597 (2.1)	74 (0.4)	82 (0.4)	65 (0.6)	72 (0.5)	79 (0.5)	72 (0.6)	76 (0.6)
Kuwait	400 (2.8)	32 (0.5)	36 (0.5)	25 (0.5)	35 (0.6)	26 (0.6)	36 (0.6)	33 (1.0)
Latvia	525 (4.8)	59 (1.0)	68 (0.9)	44 (1.3)	60 (1.0)	54 (1.3)	67 (1.0)	65 (1.2)
Netherlands	577 (3.4)	69 (0.7)	75 (0.8)	60 (0.9)	70 (0.8)	75 (0.9)	71 (0.8)	65 (1.1)
New Zealand	499 (4.3)	53 (1.0)	57 (1.0)	41 (1.1)	49 (1.1)	61 (1.3)	66 (1.1)	52 (1.2)
Norway	502 (3.0)	53 (0.7)	61 (0.8)	38 (0.7)	56 (0.7)	59 (0.9)	58 (0.9)	50 (1.2)
Portugal	475 (3.5)	48 (0.7)	57 (0.8)	38 (0.7)	49 (0.8)	43 (1.1)	52 (1.0)	47 (1.1)
Scotland	520 (3.9)	58 (0.8)	61 (0.8)	46 (1.0)	53 (0.9)	66 (1.0)	72 (0.8)	57 (1.0)
Singapore	625 (5.3)	76 (0.8)	83 (0.7)	74 (1.0)	67 (1.0)	81 (0.8)	72 (0.8)	76 (0.9)
Slovenia	552 (3.2)	64 (0.6)	74 (0.6)	50 (0.9)	64 (0.9)	64 (1.0)	72 (0.8)	68 (0.8)
South Korea	611 (2.1)	76 (0.4)	88 (0.3)	65 (0.5)	72 (0.5)	80 (0.6)	72 (0.6)	83 (0.7)
Thailand	490 (4.7)	50 (1.1)	58 (1.3)	44 (1.0)	44 (1.0)	56 (1.5)	53 (1.2)	50 (1.3)
United States	545 (3.0)	63 (0.6)	71 (0.7)	51 (0.8)	53 (0.6)	73 (0.9)	71 (0.7)	66 (0.9)

NOTE: Standard errors are shown in parentheses.

SOURCE: I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

See figure 1-12.

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Appendix table 1-13.

**Overall mean and average percentage correct on grade 8 TIMSS mathematics assessment,
by country and content area: 1994-95**

Country	Mean	All mathematics content areas	Fractions and number sense		Geometry	Algebra	Data rep- resentation, analysis, and probability	Measure- ment	Propor- tionality
All countries	513	NR	55 (0.1)	58 (0.1)	56 (0.1)	52 (0.2)	62 (0.1)	51 (0.1)	45 (0.2)
Australia	530	(4.0)	58 (0.9)	61 (0.9)	57 (1.0)	55 (1.0)	67 (0.8)	54 (1.0)	47 (0.9)
Austria	539	(3.0)	62 (0.8)	66 (0.8)	57 (1.0)	59 (0.8)	68 (0.8)	62 (1.0)	49 (0.9)
Belgium (Flemish)	565	(5.7)	66 (1.4)	71 (1.2)	64 (1.5)	63 (1.7)	73 (1.3)	60 (1.3)	53 (1.8)
Belgium (French)	526	(3.4)	59 (0.9)	62 (1.0)	58 (1.0)	53 (1.1)	68 (1.0)	56 (1.0)	48 (0.9)
Bulgaria	540	(6.3)	60 (1.2)	60 (1.4)	65 (1.3)	62 (1.5)	62 (1.1)	54 (1.6)	47 (1.5)
Canada	527	(2.4)	59 (0.5)	64 (0.6)	58 (0.6)	54 (0.7)	69 (0.5)	51 (0.7)	48 (0.7)
Colombia	385	(3.4)	29 (0.8)	31 (0.9)	29 (0.9)	28 (0.9)	37 (1.0)	25 (1.5)	23 (0.9)
Cyprus	474	(1.9)	48 (0.5)	50 (0.6)	47 (0.6)	48 (0.7)	53 (0.6)	44 (0.9)	40 (0.7)
Czech Republic	564	(4.9)	66 (1.1)	69 (1.1)	66 (1.1)	65 (1.3)	68 (0.9)	62 (1.2)	52 (1.3)
Denmark	502	(2.8)	52 (0.7)	53 (0.9)	54 (0.9)	45 (0.7)	67 (0.9)	49 (1.0)	41 (0.8)
England and Wales	506	(2.6)	53 (0.7)	54 (0.8)	54 (1.0)	49 (0.9)	66 (0.7)	50 (0.9)	41 (1.1)
France	538	(2.9)	61 (0.8)	64 (0.8)	66 (0.8)	54 (1.0)	71 (0.8)	57 (0.9)	49 (0.9)
Germany	509	(4.5)	54 (1.1)	58 (1.1)	51 (1.4)	48 (1.3)	64 (1.2)	51 (1.1)	42 (1.3)
Greece	484	(3.1)	49 (0.7)	53 (0.8)	51 (0.7)	46 (0.8)	56 (0.8)	43 (0.9)	39 (1.1)
Hong Kong	588	(6.5)	70 (1.4)	72 (1.4)	73 (1.5)	70 (1.5)	72 (1.3)	65 (1.7)	62 (1.4)
Hungary	537	(3.2)	62 (0.7)	65 (0.8)	60 (0.8)	63 (0.9)	66 (0.7)	56 (0.8)	47 (0.9)
Iceland	487	(4.5)	50 (1.1)	54 (1.2)	51 (1.4)	40 (1.3)	63 (1.1)	45 (1.4)	38 (1.4)
Iran	528	(2.2)	38 (0.6)	39 (0.6)	43 (0.8)	37 (0.8)	41 (0.6)	29 (1.2)	36 (0.8)
Ireland	527	(5.1)	59 (1.2)	65 (1.2)	51 (1.3)	53 (1.3)	69 (1.1)	53 (1.3)	51 (1.2)
Israel	522	(6.2)	57 (1.3)	60 (1.4)	57 (1.4)	61 (1.6)	63 (1.3)	48 (1.6)	43 (1.6)
Japan	605	(1.9)	73 (0.4)	75 (0.4)	80 (0.4)	72 (0.6)	78 (0.4)	67 (0.5)	61 (0.5)
Kuwait	392	(2.5)	30 (0.7)	27 (0.8)	38 (1.0)	30 (1.0)	38 (1.0)	23 (1.0)	21 (0.7)
Latvia	493	(3.1)	51 (0.8)	53 (0.9)	57 (0.8)	51 (0.9)	56 (0.8)	47 (0.9)	39 (0.9)
Lithuania	477	(3.5)	48 (0.9)	51 (1.0)	53 (1.1)	47 (1.2)	52 (1.0)	43 (0.9)	35 (0.9)
Netherlands	541	(6.7)	60 (1.6)	62 (1.6)	59 (1.8)	53 (1.6)	72 (1.7)	57 (1.6)	51 (1.9)
New Zealand	508	(4.5)	54 (1.0)	57 (1.1)	54 (1.1)	49 (1.1)	66 (1.0)	48 (1.2)	42 (1.0)
Norway	503	(2.2)	54 (0.5)	58 (0.6)	51 (0.6)	45 (0.7)	66 (0.6)	51 (0.6)	40 (0.6)
Portugal	454	(2.5)	43 (0.7)	44 (0.7)	44 (0.8)	40 (0.8)	54 (0.7)	39 (0.7)	32 (0.8)
Romania	482	(4.0)	49 (1.0)	48 (1.0)	52 (0.9)	52 (1.3)	49 (1.0)	48 (1.1)	42 (1.2)
Russian Federation	535	(5.3)	60 (1.3)	62 (1.2)	63 (1.4)	63 (1.5)	60 (1.2)	56 (1.5)	48 (1.5)
Scotland	498	(5.5)	52 (1.3)	53 (1.3)	52 (1.4)	46 (1.5)	65 (1.3)	48 (1.6)	40 (1.4)
Singapore	643	(4.9)	79 (0.9)	84 (0.8)	76 (1.0)	76 (1.1)	79 (0.8)	77 (1.0)	75 (1.0)
Slovak Republic	547	(3.3)	62 (0.8)	66 (0.8)	63 (0.8)	62 (0.9)	62 (0.7)	60 (0.9)	49 (1.0)
Slovenia	541	(3.1)	61 (0.7)	63 (0.7)	60 (0.9)	61 (0.8)	66 (0.7)	59 (0.9)	49 (0.8)
South Africa	354	(4.4)	24 (1.1)	26 (1.4)	24 (1.0)	23 (1.1)	26 (1.2)	18 (1.1)	21 (0.9)
South Korea	607	(2.4)	72 (0.5)	74 (0.5)	75 (0.6)	69 (0.6)	78 (0.6)	66 (0.7)	62 (0.6)
Spain	487	(2.0)	51 (0.5)	52 (0.5)	49 (0.6)	54 (0.8)	60 (0.7)	44 (0.7)	40 (0.8)
Sweden	519	(3.0)	56 (0.7)	62 (0.8)	48 (0.7)	44 (0.9)	70 (0.7)	56 (0.9)	44 (0.9)
Switzerland	545	(2.8)	62 (0.6)	67 (0.7)	60 (0.8)	53 (0.7)	72 (0.7)	61 (0.8)	52 (0.7)
Thailand	522	(5.7)	57 (1.4)	60 (1.5)	62 (1.3)	53 (1.7)	63 (1.1)	50 (1.4)	51 (1.5)
United States	500	(4.6)	53 (1.1)	59 (1.1)	48 (1.2)	51 (1.2)	65 (1.1)	40 (1.1)	42 (1.1)

NR = not reported

NOTE: Standard errors are shown in parentheses.

SOURCE: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996).

See figure 1-13.

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Appendix table 1-14.
**Average percentage correct on TIMSS mathematics assessment,
by country, grade, and sex: 1994-95**

Country	Grade 4		Grade 8	
	Boys	Girls	Boys	Girls
Australia	63 (0.7)	63 (0.8)	57 (1.2)	59 (1.1)
Austria	66 (0.9)	64 (0.8)	63 (0.8)	61 (1.2)
Belgium (Flemish)	NP	NP	65 (2.0)	66 (1.9)
Belgium (French)	NP	NP	59 (1.1)	58 (1.0)
Canada	61 (1.1)	60 (1.2)	59 (0.7)	59 (0.6)
Colombia	NP	NP	30 (1.6)	29 (0.9)
Cyprus	55 (0.8)	53 (0.7)	47 (0.6)	48 (0.6)
Czech Republic	67 (0.7)	66 (0.7)	67 (1.0)	64 (1.3)
Denmark	NP	NP	54 (0.8) ^a	50 (0.9)
England and Wales	57 (0.8)	56 (0.9)	53 (1.3)	53 (0.9)
France	NP	NP	62 (0.8)	61 (0.9)
Germany	NP	NP	54 (1.3)	54 (1.2)
Greece	50 (1.2)	51 (0.9)	51 (0.9)	48 (0.7)
Hong Kong	73 (1.1)	73 (0.8)	72 (1.7)	68 (1.7)
Hungary	64 (0.8)	64 (0.9)	61 (0.8)	62 (0.8)
Iceland	50 (1.0)	49 (0.9)	49 (1.3)	50 (1.3)
Iran	39 (1.4)	37 (1.1)	39 (0.8)	36 (0.8)
Ireland	63 (0.9)	64 (0.9)	60 (1.6)	58 (1.4)
Israel	60 (1.1)	59 (1.0)	61 (1.5)	55 (1.5)
Japan	75 (0.5)	74 (0.5)	74 (0.5)	73 (0.4)
Latvia	58 (1.2)	60 (1.1)	52 (1.0)	51 (0.8)
Lithuania	NP	NP	48 (1.1)	49 (1.0)
Netherlands	71 (0.8) ^a	68 (0.8)	61 (1.8)	59 (1.6)
New Zealand	52 (1.3)	54 (0.9)	55 (1.4)	53 (1.3)
Norway	54 (0.9)	53 (0.8)	54 (0.6)	53 (0.6)
Portugal	48 (0.8)	48 (0.8)	44 (0.8)	42 (0.7)
Romania	NP	NP	49 (1.1)	49 (1.0)
Russian Federation	NP	NP	59 (1.4)	61 (1.3)
Scotland	58 (0.9)	58 (0.9)	53 (1.7)	50 (1.3)
Singapore	75 (0.9)	76 (1.0)	79 (1.1)	79 (1.0)
Slovak Republic	NP	NP	63 (0.9)	62 (0.8)
Slovenia	64 (0.7)	65 (0.9)	62 (0.8)	60 (0.7)
South Africa	NP	NP	25 (1.7)	22 (1.0)
South Korea	77 (0.4) ^a	75 (0.5)	73 (0.6) ^a	70 (0.7)
Spain	NP	NP	52 (0.7)	50 (0.7)
Sweden	NP	NP	56 (0.8)	56 (0.8)
Switzerland	NP	NP	63 (0.8)	61 (0.7)
Thailand	49 (1.3)	52 (1.0)	56 (1.4)	58 (1.7)
United States	63 (0.7)	62 (0.7)	53 (1.2)	53 (1.1)

NP = did not participate in grade 4 assessment

NOTE: Standard errors are shown in parentheses.

^aDifference between the sexes is statistically significant at the 0.05 level, adjusted for multiple comparisons.

SOURCES: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

Appendix table 1-15.

Students scoring in the top 10th percentile on the TIMSS science and mathematics assessments, by country and grade: 1994-95

Country	Science		Mathematics	
	Grade 4	Grade 8	Grade 4	Grade 8
Australia	14 (0.7)	16 (0.9)	12 (0.7)	11 (0.9)
Austria	10 (0.9)	16 (0.9)	11 (1.1)	11 (0.7)
Belgium (Flemish)	NP	10 (0.8)	NP	17 (1.2)
Belgium (French)	NP	1 (0.2)	NP	6 (0.6)
Bulgaria	NP	21 (1.4)	NP	16 (1.9)
Canada	9 (0.7)	9 (0.6)	7 (0.8)	7 (0.7)
Colombia	NP	0 (0.1)	NP	0 (0.0)
Cyprus	1 (0.1)	1 (0.2)	4 (0.5)	2 (0.3)
Czech Republic	11 (1.0)	19 (1.6)	15 (1.3)	18 (1.9)
Denmark	NP	2 (0.3)	NP	4 (0.5)
England and Wales	13 (1.0)	17 (0.9)	7 (0.7)	7 (0.6)
France	NP	1 (0.2)	NP	7 (0.8)
Germany	NP	11 (1.0)	NP	6 (0.7)
Greece	1 (0.2)	4 (0.4)	3 (0.5)	3 (0.4)
Hong Kong	4 (0.7)	7 (0.8)	18 (1.5)	27 (2.1)
Hungary	5 (0.6)	14 (0.8)	11 (1.1)	11 (0.8)
Iceland	3 (0.4)	2 (0.5)	1 (0.3)	1 (0.3)
Iran	0 (0.1)	1 (0.1)	0 (0.1)	0 (0.0)
Ireland	7 (0.6)	12 (0.9)	10 (0.7)	9 (1.0)
Israel	3 (0.5)	11 (1.2)	6 (0.7)	6 (0.9)
Japan	11 (0.6)	18 (0.6)	23 (0.9)	32 (0.8)
Kuwait	0 (0.1)	0 (0.0)	0 (0.1)	0 (0.0)
Latvia	4 (1.2)	2 (0.3)	6 (1.3)	3 (0.5)
Lithuania	NP	1 (0.3)	NP	1 (0.3)
Netherlands	5 (0.6)	12 (1.1)	13 (1.1)	10 (1.6)
New Zealand	9 (0.9)	11 (0.9)	3 (0.7)	6 (0.8)
Norway	6 (0.6)	7 (0.5)	2 (0.3)	4 (0.4)
Portugal	1 (0.2)	1 (0.1)	1 (0.2)	0 (0.1)
Romania	NP	5 (0.6)	NP	3 (0.4)
Russian Federation	NP	11 (0.8)	NP	10 (0.7)
Scotland	9 (0.8)	9 (1.1)	6 (0.8)	5 (0.9)
Singapore	11 (1.5)	31 (2.3)	39 (2.3)	45 (2.5)
Slovak Republic	NP	12 (0.9)	NP	12 (1.0)
Slovenia	6 (0.7)	14 (0.9)	11 (0.9)	11 (0.7)
South Africa	NP	1 (0.2)	NP	0 (0.0)
South Korea	17 (0.9)	18 (0.8)	26 (1.2)	34 (1.1)
Spain	NP	4 (0.3)	NP	2 (0.2)
Sweden	NP	9 (0.6)	NP	5 (0.5)
Switzerland	NP	7 (0.6)	NP	11 (0.7)
Thailand	0 (0.1)	4 (0.5)	1 (0.2)	7 (1.2)
United States	16 (0.9)	13 (0.8)	9 (0.8)	5 (0.6)

NP = did not participate in grade 4 assessment

SOURCES: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

Science & Engineering Indicators – 1998

Appendix table 1-16.

Students who report “never or almost never” using computers in science and mathematics courses, by country and grade: 1994-95

Country	Mathematics: Grade 4		Mathematics: Grade 8		Science: Grade 8	
	Percentage of students	Mean TIMSS achievement	Percentage of students	Mean TIMSS achievement	Percentage of students	Mean TIMSS achievement
Australia	66 (4.5)	548 (5.3)	78 (3.2)	531 (5.3)	NA	NA
Austria	98 (1.6)	560 (3.5)	69 (4.5)	551 (5.6)	85 (2.6)	565 (3.1)
Belgium (Flemish)	NA	NA	99 (0.7)	574 (4.6)	98 (1.0)	555 (5.9)
Belgium (French)	NA	NA	95 (2.4)	543 (4.4)	95 (2.0)	483 (3.5)
Canada	58 (4.0)	540 (4.5)	82 (3.5)	533 (2.9)	76 (3.3)	536 (2.9)
Colombia	NA	NA	94 (2.2)	387 (3.8)	95 (2.5)	413 (4.5)
Cyprus	86 (5.1)	508 (4.2)	89 (3.3)	468 (2.9)	92 (1.1)	456 (2.6)
Czech Republic	97 (1.7)	568 (3.3)	74 (5.4)	560 (6.4)	93 (2.0)	573 (4.6)
Denmark	NA	NA	38 (4.5)	500 (4.5)	63 (5.9)	482 (4.4)
England and Wales	NA	NA	53 (3.9)	517 (5.9)	70 (3.3)	567 (6.9)
France	NA	NA	86 (3.2)	541 (3.3)	97 (1.2)	499 (2.5)
Germany	NA	NA	87 (3.1)	510 (5.8)	95 (1.8)	536 (6.2)
Greece	99 (1.4)	495 (4.1)	85 (2.9)	481 (3.3)	93 (3.2)	498 (2.2)
Hong Kong	99 (0.8)	589 (4.3)	90 (3.5)	590 (7.3)	95 (2.5)	523 (5.3)
Hungary	NA	NA	NA	NA	NA	NA
Iceland	NA	NA	NA	NA	73 (6.1)	489 (4.5)
Iran	99 (1.1)	428 (4.1)	93 (5.5)	430 (2.3)	99 (0.5)	469 (2.4)
Ireland	90 (3.2)	549 (3.7)	99 (0.9)	528 (6.0)	96 (1.4)	540 (6.0)
Israel	NA	NA	NA	NA	75 (8.0)	538 (8.3)
Japan	93 (2.3)	598 (2.1)	90 (2.7)	604 (2.5)	84 (2.8)	572 (2.0)
Kuwait	98 (1.3)	401 (3.4)	73 (7.1)	393 (2.9)	78 (7.7)	427 (4.5)
Latvia	95 (2.0)	522 (5.0)	97 (1.6)	490 (3.3)	91 (1.5)	485 (2.6)
Lithuania	NA	NA	94 (1.8)	480 (4.1)	96 (1.1)	477 (4.2)
Netherlands	65 (5.0)	581 (4.9)	NA	NA	85 (2.6)	559 (7.4)
New Zealand	69 (3.8)	499 (4.6)	86(3.1)	506(4.4)	90 (2.7)	526 (4.7)
Norway	80 (3.7)	502 (3.6)	90(2.6)	507(2.7)	96 (1.9)	525 (2.3)
Portugal	98 (1.2)	475 (3.7)	97(1.5)	454(2.6)	99 (0.5)	480 (2.5)
Romania	NA	NA	96 (1.7)	481 (4.4)	94 (1.3)	487 (4.7)
Russian Federation	NA	NA	78 (2.6)	533 (6.8)	88 (1.7)	538 (4.6)
Scotland	NA	NA	NA	NA	NA	NA
Singapore	66 (4.2)	627 (5.7)	92 (2.7)	643 (5.3)	95 (1.5)	606 (5.8)
Slovak Republic	NA	NA	95 (1.5)	543 (3.3)	96 (2.0)	546 (3.9)
Slovenia	92 (2.8)	549 (3.5)	69 (4.5)	539 (4.5)	60 (3.1)	556 (3.5)
South Korea	96 (1.7)	610 (2.2)	96 (1.6)	610 (2.5)	96 (1.7)	566 (2.2)
Spain	NA	NA	89 (3.1)	488 (2.6)	92 (2.7)	519 (2.1)
Sweden	NA	NA	74 (2.9)	519 (4.1)	NA	NA
Switzerland	NA	NA	87 (3.2)	549 (5.6)	78 (4.3)	527 (4.9)
Thailand	96 (2.6)	491 (5.3)	97 (2.0)	528 (7.5)	92 (3.6)	530 (5.3)
United States	60 (4.1)	546 (4.7)	76 (3.1)	502 (5.9)	NA	NA

NA = not available; TIMSS = Third International Mathematics and Science Study

NOTE: Standard errors are shown in parentheses.

SOURCES: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997); and A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996). A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

Appendix table 1-17.

**Average number of hours per day students report spending on out-of-school TV and study time,
by country and grade: 1994-95**

Country	Grade 4			Grade 8			
	Time spent:			Time spent:			
	Watching TV or videos	On math homework or studying	On science homework or studying	Watching TV or videos	Studying or doing homework	On math homework or studying	On science homework or studying
Australia	2.0 (0.05)	0.8 (0.02)	0.4 (0.02)	2.4 (0.05)	2.0 (0.04)	0.7 (0.02)	0.5 (0.01)
Austria	1.4 (0.04)	1.0 (0.03)	0.9 (0.03)	1.9 (0.06)	2.4 (0.07)	0.8 (0.02)	0.7 (0.03)
Belgium (Flemish)	NA	NA	NA	2.0 (0.05)	3.4 (0.07)	1.1 (0.03)	0.8 (0.02)
Belgium (French)	NA	NA	NA	1.9 (0.08)	3.0 (0.07)	1.0 (0.02)	0.8 (0.02)
Canada	1.9 (0.04)	0.8 (0.02)	0.6 (0.03)	2.3 (0.04)	2.2 (0.07)	0.7 (0.02)	0.6 (0.02)
Colombia	NA	NA	NA	2.2 (0.07)	4.6 (0.15)	1.3 (0.06)	1.2 (0.06)
Cyprus	1.8 (0.05)	1.1 (0.03)	0.8 (0.03)	2.3 (0.04)	3.6 (0.06)	1.2 (0.02)	0.9 (0.02)
Czech Republic	1.7 (0.04)	0.7 (0.02)	0.6 (0.02)	2.6 (0.05)	1.8 (0.05)	0.6 (0.02)	0.6 (0.02)
Denmark	NA	NA	NA	2.2 (0.06)	1.4 (0.05)	0.5 (0.02)	0.3 (0.02)
England and Wales	2.2 (0.04)	NA	NA	2.7 (0.07)	NA	NA	NA
France	NA	NA	NA	1.5 (0.04)	2.7 (0.05)	0.9 (0.02)	0.6 (0.01)
Germany	NA	NA	NA	1.9 (0.04)	2.0 (0.05)	0.6 (0.02)	0.6 (0.02)
Greece	1.3 (0.04)	1.6 (0.04)	1.3 (0.03)	2.1 (0.04)	4.4 (0.08)	1.2 (0.03)	1.2 (0.03)
Hong Kong	1.5 (0.04)	1.3 (0.03)	0.9 (0.02)	2.6 (0.05)	2.5 (0.06)	0.9 (0.02)	0.6 (0.02)
Hungary	2.3 (0.05)	1.0 (0.03)	1.0 (0.03)	3.0 (0.06)	3.1 (0.06)	0.8 (0.02)	1.1 (0.02)
Iceland	1.2 (0.04)	0.8 (0.02)	0.3 (0.02)	2.2 (0.05)	2.4 (0.07)	0.9 (0.03)	0.6 (0.03)
Iran	1.3 (0.05)	2.3 (0.07)	2.1 (0.06)	1.8 (0.06)	6.4 (0.13)	2.0 (0.05)	1.9 (0.05)
Ireland	1.9 (0.05)	0.8 (0.02)	0.4 (0.02)	2.1 (0.03)	2.7 (0.05)	0.7 (0.02)	0.6 (0.01)
Israel	2.5 (0.06)	1.1 (0.05)	0.9 (0.04)	3.3 (0.10)	2.8 (0.10)	1.0 (0.04)	0.6 (0.03)
Japan	1.9 (0.03)	0.9 (0.02)	0.4 (0.02)	2.6 (0.04)	2.3 (0.04)	0.8 (0.01)	0.6 (0.01)
Kuwait	1.4 (0.03)	1.9 (0.05)	1.8 (0.05)	1.9 (0.07)	5.3 (0.12)	1.6 (0.04)	1.5 (0.05)
Latvia	2.3 (0.07)	1.0 (0.03)	0.8 (0.03)	2.6 (0.05)	2.7 (0.05)	0.9 (0.02)	0.6 (0.02)
Lithuania	NA	NA	NA	2.8 (0.05)	2.7 (0.06)	0.8 (0.02)	0.7 (0.02)
Netherlands	1.7 (0.06)	0.5 (0.03)	0.4 (0.03)	2.5 (0.09)	2.2 (0.04)	0.6 (0.01)	0.6 (0.01)
New Zealand	2.0 (0.06)	0.8 (0.03)	0.5 (0.02)	2.5 (0.05)	2.1 (0.05)	0.7 (0.02)	0.6 (0.01)
Norway	1.7 (0.04)	0.6 (0.02)	0.4 (0.02)	2.5 (0.04)	2.3 (0.04)	0.7 (0.02)	0.6 (0.01)
Portugal	1.5 (0.05)	1.3 (0.03)	1.3 (0.03)	2.0 (0.04)	3.0 (0.05)	1.0 (0.02)	0.9 (0.02)
Romania	NA	NA	NA	1.9 (0.06)	5.0 (0.18)	1.8 (0.07)	1.6 (0.06)
Russian Federation	NA	NA	NA	2.9 (0.05)	2.9 (0.05)	0.9 (0.02)	1.0 (0.02)
Scotland	1.9 (0.06)	0.5 (0.02)	0.3 (0.02)	2.7 (0.05)	1.8 (0.04)	0.6 (0.02)	0.5 (0.01)
Singapore	NA	NA	NA	2.7 (0.05)	4.6 (0.04)	1.4 (0.02)	1.3 (0.02)
Slovak Republic	NA	NA	NA	2.7 (0.05)	2.4 (0.04)	0.7 (0.01)	0.8 (0.02)
Slovenia	1.5 (0.04)	1.0 (0.03)	1.0 (0.03)	2.0 (0.04)	2.9 (0.05)	0.9 (0.02)	1.0 (0.02)
South Korea	1.5 (0.03)	1.0 (0.02)	0.8 (0.02)	2.0 (0.04)	2.5 (0.05)	0.8 (0.02)	0.6 (0.02)
Spain	NA	NA	NA	1.8 (0.05)	3.6 (0.06)	1.2 (0.02)	1.0 (0.02)
Sweden	NA	NA	NA	2.3 (0.04)	2.3 (0.04)	0.7 (0.01)	0.7 (0.01)
Switzerland	NA	NA	NA	1.3 (0.03)	2.7 (0.04)	0.9 (0.02)	0.7 (0.01)
Thailand	1.1 (0.09)	1.0 (0.03)	0.7 (0.03)	2.1 (0.07)	3.5 (0.06)	1.2 (0.03)	1.0 (0.02)
United States	2.0 (0.04)	1.0 (0.03)	0.8 (0.02)	2.6 (0.07)	2.3 (0.04)	0.8 (0.02)	0.6 (0.01)

NA = not available

NOTE: Standard errors are shown in parentheses.

SOURCES: A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997); A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

See figure 1-16.

Science & Engineering Indicators – 1998

Appendix table 1-18.

Grade 8 teachers' beliefs about the nature and teaching of mathematics and science: 1994-95
(Percentages)

Belief	Strongly disagree	Disagree	Agree	Strongly agree	Agree/strongly agree ^a
Mathematics					
Math is primarily an abstract subject	11.7 (2.6)	57.3 (4.6)	28.9 (3.9)	2.2 (0.9)	31.0 (3.9)
Math is primarily a formal way of representing the real world	1.0 (0.8)	19.9 (3.7)	67.9 (3.9)	11.2 (2.4)	79.1 (3.7)
Math is primarily a practical and structured guide for addressing real situations	0.0 (0.0)	11.2 (2.0)	69.5 (3.4)	19.3 (2.7)	88.8 (2.0)
If students are having difficulty, an effective approach is to give them more practice by themselves during the class	20.1 (3.6)	57.6 (4.5)	19.5 (3.2)	2.9 (0.9)	22.4 (3.0)
Some students have a natural talent for math and others do not	3.5 (1.4)	15.0 (2.4)	64.2 (3.8)	17.2 (3.4)	81.4 (2.8)
More than one representation should be used in teaching a math topic	0.0 (0.0)	1.7 (1.0)	46.6 (3.9)	51.7 (3.7)	98.3 (1.0)
Math should be learned as sets of algorithms or rules that cover all possibilities	10.9 (2.4)	53.9 (3.8)	32.6 (3.4)	2.6 (0.9)	35.2 (3.6)
Basic computational skills on the part of the teacher are sufficient for teaching elementary school math	42.3 (3.7)	40.4 (3.6)	11.5 (3.3)	5.8 (1.7)	17.3 (3.8)
A liking for and understanding of students are essential for teaching math	0.8 (0.3)	2.6 (1.0)	40.9 (4.2)	55.7 (4.1)	96.5 (1.1)
Science					
Science is primarily an abstract subject	17.9 (2.1)	63.9 (3.2)	18.1 (3.2)	0.1 (0.1)	18.2 (3.2)
Science is primarily a formal way of representing the real world	1.4 (0.8)	14.3 (2.3)	69.7 (4.3)	14.7 (3.6)	84.3 (2.6)
Science is primarily a practical and structured guide for addressing real situations	0.0 (0.0)	12.0 (2.9)	66.0 (4.6)	22.0 (3.8)	88.0 (2.9)
Some students have a natural talent for science and others do not	6.3 (1.5)	31.8 (3.8)	51.8 (3.7)	10.2 (2.8)	62.0 (3.2)
It is important for teachers to give students prescriptive and sequential directions for science experiments	3.3 (1.3)	20.8 (3.1)	48.9 (5.1)	27.1 (4.0)	75.8 (3.6)
Focusing on rules is a bad idea. It gives students the impression that the sciences are a set of procedures to be memorized	15.3 (2.9)	52.7 (4.8)	26.1 (3.2)	5.9 (2.9)	32.0 (3.7)
If students get into debates in class about ideas or procedures covering the sciences, it can harm their learning	56.5 (3.7)	40.7 (3.8)	0.7 (0.7)	2.1 (1.8)	2.8 (1.9)
Students see a science task as the same task when it is represented in two different ways	4.6 (1.5)	52.6 (3.9)	41.9 (4.2)	0.8 (0.4)	42.8 (4.2)
A liking for and understanding of students are essential for teaching science	1.3 (0.8)	9.1 (2.7)	43.2 (3.6)	46.4 (4.0)	89.6 (2.7)

NOTES: Data reflect the beliefs of grade 8 mathematics and science teachers surveyed as part of the Third International Mathematics and Science Study. Responses are to the question: "To what extent do you agree or disagree with each of the following statements?" Standard errors are shown in parentheses. Details may not add to totals because of rounding.

^aData in this column reflect the combined categories "Agree" and "Strongly agree."

SOURCE: T. Williams, D. Levine, L. Martin, P. Butler, C. Heid, and J. Haynes, *Mathematics and Science in the Eighth Grade*, report prepared for the National Center for Education Statistics (Rockville, MD: Westat, Inc., 1997).

See figure 1-19.

Science & Engineering Indicators – 1998

Appendix table 1-19.

Grade 8 teachers' perceptions of student skills required for success in mathematics and science: 1994-95
 (Percentages)

Skill	Not important	Somewhat important	Very important
Mathematics			
Remember formulas and procedures	3.0 (1.1)	54.0 (3.5)	43.0 (3.5)
Think in sequential manner	0.6 (0.6)	20.0 (2.7)	79.5 (2.8)
Understand concepts	0.0 (0.0)	11.1 (3.0)	88.9 (3.0)
Think creatively	2.0 (0.9)	32.7 (3.8)	65.4 (4.0)
Understand math use in real world	0.0 (0.0)	18.3 (2.7)	81.7 (2.7)
Support solutions	2.4 (2.4)	16.9 (3.3)	80.8 (4.1)
Science			
Remember formulas and procedures	10.8 (2.4)	63.7 (4.1)	25.5 (4.0)
Think in sequential manner	1.3 (0.9)	19.1 (2.5)	79.6 (2.9)
Understand concepts	0.7 (0.7)	15.4 (2.4)	84.0 (2.5)
Think creatively	0.2 (0.2)	26.7 (3.6)	73.0 (3.7)
Understand science use in real world	0.3 (0.3)	20.5 (3.4)	79.2 (3.5)
Support solutions	0.0 (0.0)	13.9 (3.0)	86.1 (3.0)

NOTES: Data reflect the beliefs of grade 8 mathematics and science teachers surveyed as part of the Third International Mathematics and Science Study. Responses are to the statement: "*To be good at mathematics [science] at school, how important do you think it is for students to...?*" Standard errors are shown in parentheses. Details may not add to totals because of rounding.

SOURCE: T. Williams, D. Levine, L. Martin, P. Butler, C. Heid, and J. Haynes, *Mathematics and Science in the Eighth Grade*, report prepared for the National Center for Education Statistics, (Rockville, MD: Westat, Inc., 1997).

See figure 1-20.

Science & Engineering Indicators – 1998

Appendix table 1-20.
Requirements for state teacher license: 1996

State	Major in subject field ^a	Written test	Performance assessment ^b
Alabama	No	-	-
Alaska	Yes	-	Yes
Arizona	-	-	-
Arkansas	No	Yes	-
California	Yes ^c	Yes	-
Colorado	Yes ^c	Yes	Yes
Connecticut	Yes ^c	Yes	Yes
Delaware	No	Yes	-
Florida	No	Yes	Yes
Georgia	Yes	Yes	-
Hawaii	Yes	Yes	-
Idaho	Yes	-	-
Illinois	Yes	Yes	-
Indiana	Yes	Yes	-
Iowa	Yes ^c	-	-
Kansas	No	Yes	-
Kentucky	Yes	Yes	Yes
Louisiana	-	-	-
Maine	Yes	Yes	-
Maryland	No	Yes	Yes
Massachusetts	Yes ^c	Yes	-
Michigan	No	Yes	Yes
Minnesota	Yes	Yes	-
Mississippi	Yes	Yes	Yes
Missouri	Yes ^c	Yes	Yes
Montana	No	Yes	-
Nebraska	No	Yes	-
Nevada	Yes	Yes	-
New Hampshire	Yes ^c	-	-
New Jersey	-	-	-
New Mexico	Yes	Yes	-
New York	No	Yes	Yes
North Carolina	No	Yes	Yes
North Dakota	Yes	-	Yes
Ohio	No	Yes	Yes
Oklahoma	No	Yes	-
Oregon	No	Yes	Yes
Pennsylvania	No	Yes	-
Rhode Island	Yes	-	-
South Carolina	Yes	Yes	Yes
South Dakota	Yes	-	Yes
Tennessee	Yes	-	-
Texas	Yes ^c	Yes	-
Utah	Yes	-	-
Vermont	No	-	-
Virginia	Yes ^c	Yes	-
Washington	No	-	Yes
West Virginia	No	Yes	-
Wisconsin	Yes	Yes	Yes
Wyoming	Yes	-	-

- = data not available

^aA major in education is not accepted. "Yes" denotes that a subject major is required for middle and/or secondary teaching license.

^bPerformance assessment comprises one or more of the following techniques: portfolios, classroom observations, simulated exercises.

^cA subject major is required for all teachers K-12, not just for middle/secondary teachers.

SOURCE: Council of Chief State School Officers, *Key State Education Policies on K-12 Education: Content Standards, Graduation, Teacher Licensure, Time and Attendance* (Washington, DC: 1996).

Appendix table 1-21.
National trends in science coursetaking at age 17, by sex and race/ethnicity: 1986, 1990, 1992, and 1994

Course and year	Total		Male		Female		White		Black		Hispanic	
	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students
	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students
General science												
1986	290 (1.3) ^a	83 (1.3)	298 (1.7)	84 (1.5)	283 (1.6) ^a	82 (1.6)	297 (1.5) ^a	84 (1.6)	257 (2.8)	83 (2.6)	264 (4.5)	82 (3.5)
1990	292 (1.1)	82 (1.3)	298 (1.4)	84 (1.3)	286 (1.4)	81 (1.7)	300 (1.1) ^a	84 (1.4)	258 (4.5)	76 (3.1)	266 (4.8)	82 (4.4)
1992	297 (1.3) ^b	94 (1.0)	301 (1.6)	86 (1.1)	290 (1.5) ^b	83 (1.5)	304 (1.3) ^b	86 (1.0)	259 (3.9)	79 (3.6)	274 (5.4)	79 (3.2)
1994	296 (1.6) ^b	83 (1.3)	302 (2.2)	84 (1.5)	291 (1.8) ^b	82 (1.4)	306 (1.7) ^b	84 (1.5)	259 (3.3)	80 (1.9)	268 (5.1)	77 (2.4)
Biology												
1986	294 (1.5) ^a	88 (1.0) ^a	301 (1.8)	87 (1.1) ^a	287 (1.7) ^a	88 (1.1) ^a	301 (1.8) ^a	89 (1.1) ^a	260 (3.1)	84 (2.7)	265 (3.7)	84 (3.4)
1990	296 (1.0) ^a	89 (0.9) ^a	302 (1.3)	87 (1.1) ^a	290 (1.5)	91 (1.0)	304 (1.0) ^a	90 (0.9) ^a	260 (4.6)	87 (2.2)	270 (5.0)	79 (4.4)
1992	299 (1.1) ^b	92 (0.9) ^b	305 (1.5)	91 (1.2) ^b	293 (1.4) ^b	93 (1.0) ^b	308 (1.1) ^b	93 (1.0) ^b	260 (3.1)	92 (1.9) ^b	276 (4.5)	87 (4.1)
1994	300 (1.2) ^b	93 (0.9) ^b	306 (1.8)	92 (0.9) ^b	294 (1.3) ^b	93 (1.0) ^b	310 (1.3) ^b	94 (0.9) ^b	263 (2.7)	93 (1.8) ^b	273 (6.1)	84 (3.4)
Chemistry												
1986	312 (2.1)	40 (1.6) ^a	319 (2.7)	42 (1.8) ^a	304 (2.2)	39 (2.1) ^a	317 (2.2) ^a	43 (1.8) ^a	275 (6.4)	29 (2.6) ^a	281 (8.7)	24 (2.2) ^a
1990	316 (1.4)	45 (1.5) ^a	324 (1.9)	45 (1.7)	310 (1.7)	45 (1.7) ^a	325 (1.3) ^b	46 (1.7) ^a	280 (7.3)	46 (4.0) ^b	295 (6.0)	31 (4.3)
1992	319 (1.0) ^b	49 (1.7) ^b	325 (1.5)	47 (1.9)	313 (1.5) ^b	51 (2.0) ^b	325 (1.3) ^b	52 (1.8) ^b	282 (3.6)	36 (3.2) ^b	298 (4.1)	36 (5.6)
1994	315 (1.7)	53 (2.1) ^b	322 (2.4)	50 (2.6) ^b	309 (1.9)	55 (2.3) ^b	324 (1.7) ^b	54 (2.5) ^b	278 (3.4)	51 (3.6) ^b	288 (6.3)	41 (3.0) ^b
Physics												
1986	296 (4.7) ^a	11 (0.9) ^a	305 (6.8)	14 (1.3) ^a	282 (3.8) ^a	8 (0.7) ^a	316 (4.4)	10 (0.8) ^a	239 (5.4) ^a	18 (3.5)	257 (17.6)	13 (2.8)
1990	304 (3.7)	14 (1.5)	311 (4.3)	16 (1.8)	295 (4.2) ^a	13 (1.5) ^b	317 (2.6)	13 (1.7)	263 (11.8)	15 (2.7)	253 (18.3)	17 (4.5)
1992	306 (3.9)	14 (1.1) ^a	310 (4.7)	15 (1.0) ^a	302 (4.1) ^b	12 (1.5)	319 (3.5)	13 (1.2) ^a	251 (7.4)	14 (1.9)	282 (11.1)	13 (2.3)
1994	314 (2.9) ^b	18 (1.2) ^b	318 (4.1)	20 (1.5) ^b	310 (3.3) ^b	16 (1.3) ^b	326 (3.2)	18 (1.4) ^b	268 (7.5) ^t	16 (2.0)	*	*

* = sample size insufficient to permit reliable estimates; NAEP = National Assessment of Educational Progress

NOTES: Scale scores range from 0 to 300. Significance tests for extreme percentages (either >90 or <10 percent) should be interpreted with caution. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within ± 2 standard errors of the estimate for the sample. Use the standard error of difference in comparing estimates. Details may not add to totals because of rounding. Standard errors are shown in parentheses.

^aStatistically different from 1994 at the 0.05 level, adjusted for multiple comparisons.

^bStatistically significant difference from 1986 at the 0.05 level, adjusted for multiple comparisons.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey, *NAEP 1994: Trends in Academic Progress* (Washington, DC: National Center for Education Statistics, 1996).

Appendix table 1-22.
Highest level of mathematics courses taken at age 17, by sex and race/ethnicity: 1978 and 1994

Course and year	Average NAEPE math scale score	Percentage of students	Total		Male		Female		White		Black		Hispanic	
			Average NAEPE math scale score		Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students
			Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students	Average NAEPE math scale score	Percentage of students
Prealgebra or general mathematics														
1978	267 (0.8)	20 (1.0) ^a	269 (1.0) ^a	21 (1.0)	265 (0.9)	20 (1.1) ^a	272 (0.6)	18 (1.1) ^a	247 (1.6) ^a	31 (1.3)	256 (2.3) ^a	*	36 (3.1)	
1994	272 (1.2)	9 (1.1)	274 (1.8)	11 (1.2)	268 (1.9)	8 (1.2)	275 (1.4)	9 (1.1)	*	*	*	*	*	
Algebra 1														
1978	286 (0.7)	17 (0.6)	289 (0.9)	15 (0.6)	284 (1.0)	18 (0.7) ^a	291 (0.6)	17 (0.6) ^a	264 (1.5) ^a	19 (1.2)	273 (2.8) ^a	*	19 (2.1)	
1994	288 (1.4)	15 (0.9)	289 (1.6)	16 (1.3)	286 (1.9)	14 (0.9)	292 (1.7)	14 (0.9)	275 (3.3)	21 (2.4)	*	*	*	
Geometry														
1978	307 (0.7) ^a	16 (0.6)	310 (1.0) ^a	15 (0.5)	304 (0.8) ^a	18 (0.8) ^a	310 (0.6) ^a	17 (0.7) ^a	281 (1.9)	11 (0.8) ^a	294 (4.4)	*	12 (1.2)	
1994	297 (1.7)	15 (0.8)	301 (2.1)	15 (0.9)	293 (1.8)	15 (1.1)	301 (1.5)	14 (1.0)	283 (3.8)	17 (2.2)	*	*	*	
Algebra 2														
1978	321 (0.7) ^a	37 (1.2) ^a	325 (0.8) ^a	38 (1.2) ^a	318 (0.9) ^a	37 (1.3) ^a	325 (0.6) ^a	39 (1.3) ^a	292 (1.4)	28 (2.1) ^a	303 (2.9)	23 (2.5) ^a		
1994	316 (1.0)	47 (1.6)	320 (1.5)	44 (1.9)	313 (1.1)	50 (2.0)	320 (1.0)	48 (1.9)	297 (2.5)	45 (3.4)	304 (4.1)	38 (3.5)	*	
Precalculus or calculus														
1978	334 (1.4) ^a	6 (0.4) ^a	337 (2.0)	7 (0.5) ^a	329 (1.8) ^a	4 (0.4) ^a	338 (1.1) ^a	6 (0.4) ^a	297 (6.5) ^a	4 (0.6)	306 (6.1)	3 (0.9)		
1994	340 (2.2)	13 (1.2)	343 (2.6)	13 (1.3)	337 (2.8)	12 (1.5)	344 (2.0)	14 (1.5)	*	*	*	*	*	

* = sample size insufficient to permit reliable estimates

NOTES: It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within ± 2 standard errors of the estimate for the sample. Use the standard error of difference in comparing estimates. Details may not add to totals because a small percentage of students reported having taken other mathematics courses. Standard errors are shown in parentheses.

^aStatistically significant difference between 1994 and the earliest year with available data at the 0.05 level; this is not adjusted for multiple comparisons.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey, NAEPE 1994: Trends in Academic Progress (Washington, DC: National Center for Education Statistics, 1996).

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Appendix table 1-23.

Frequency of calculator use in grade 8 mathematics and science classes, by type of activity: 1994-95
 (Percentage of teachers reporting)

Activity	Hardly ever	Once or twice a month	Once or twice a week	Every day
Mathematics				
Checking answers	17.4 (3.3)	10.8 (2.3)	16.4 (3.2)	55.4 (4.6)
Tests and exams	31.0 (3.9)	22.9 (3.7)	21.8 (3.4)	24.3 (4.6)
Routine computation	22.9 (3.6)	8.9 (2.2)	16.1 (3.0)	52.1 (5.1)
Solving complex problems	11.4 (2.5)	12.2 (2.3)	23.0 (3.8)	53.4 (4.7)
Exploring number concepts	23.6 (2.9)	17.6 (3.0)	22.7 (3.9)	36.1 (3.6)
Science				
Checking answers	50.8 (3.4)	29.7 (3.8)	17.2 (3.3)	2.3 (1.2)
Tests and exams	67.7 (3.5)	22.6 (3.0)	6.4 (2.2)	3.3 (1.4)
Routine computation	39.3 (4.0)	33.0 (4.5)	19.7 (3.2)	8.0 (1.8)
Solving complex problems	46.7 (3.7)	35.1 (3.9)	14.4 (3.3)	3.9 (1.3)
Exploring number concepts	68.7 (3.8)	19.6 (3.6)	10.4 (2.7)	1.4 (0.4)

NOTE: Percentages may not total 100 because of rounding. Standard errors are shown in parentheses.

SOURCE: T. Williams, D. Levine, L. Martin, P. Butler, C. Heid, and J. Haynes, *Mathematics and Science in the Eighth Grade*, report prepared for the National Center for Education Statistics (Rockville, MD: Westat, Inc., 1997).

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Appendix table 1-24.

**Percentage of public secondary school students taught by teachers without
at least a minor in the field, by field and selected classroom characteristics: 1990-91**

Characteristic	English	Math	Science			Social studies	
			All sciences	Life science	Physical science	All social studies	History
Total	20.8	26.6	16.5	38.5	56.2	13.4	53.9
Achievement level of class							
Low achievement	28.2	33.7	26.6	48.7	66.7	18.4	60.1
Average achievement	19.0	25.6	15.2	33.7	58.0	12.5	52.1
High achievement	16.3	21.6	9.2	32.0	45.5	11.8	52.6
Type or track of class							
Low-track	24.7	33.5	20.4	42.3	66.8	14.3	55.1
Medium-track	11.8	15.7	9.2*	31.4	42.8	8.9	44.9
High-track	11.2	20.4*	7.2*	20.7	43.0	11.2	51.1
Minority enrollment of class							
Low minority	19.2	22.7	14.6	36.6	56.3	12.3	55.6
Medium minority	19.9	24.2	17.7	42.8	54.1	15.0	52.7
High minority	25.2	36.1	19.6	37.6	58.7	14.3	51.4
Grade level of class							
7th grade	32.2	48.8	31.8	60.4	73.8	23.9	56.3
8th grade	32.9	37.1	23.8	32.9*	75.7	19.7	60.5
9th grade	15.7	18.1	10.7	27.9	61.7	8.7	48.7
10th grade	11.1	16.8	8.9*	29.3	45.7	8.8	51.1
11th grade	11.2	15.9	6.4	23.5*	36.8	6.8	47.0
12th grade	13.9	24.2	13.1*	25.3*	41.0	11.3	62.4

*Coefficient of variation greater than 30 percent.

NOTE: The estimates for life science, physical science, and history represent the proportion of students taught by teachers without at least a minor in those particular subfields.

SOURCE: R. Ingersoll, *Out-of-Field Teaching and Educational Equality*, NCES 96-040. (Washington, DC: U.S. Department of Education, 1996).

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Appendix table 1-25.

Percentage of public schools and instructional rooms with Internet access, by school characteristics: 1994-96

Characteristic	Percentage of schools with Internet access			Percentage of instructional rooms with Internet access		
	1994	1995	1996	1994	1995	1996
All public schools	35 (1.5)	50 (1.8)	65 (1.8)	3 (0.3)	8 (0.7)	14 (1.0)
Instructional level						
Elementary	30 (1.9)	46 (2.4)	61 (2.1)	3 (0.4)	8 (1.0)	13 (1.5)
Secondary	49 (2.4)	65 (2.7)	77 (1.8)	4 (0.6)	8 (1.0)	16 (1.5)
Percent minority enrollment						
Less than 6 percent	- -	52 (3.3)	65 (3.4)	- -	9 (1.4)	18 (2.4)
6 to 20 percent	- -	58 (4.4)	72 (3.0)	- -	10 (1.5)	18 (2.2)
21 to 49 percent	- -	54 (4.0)	65 (3.2)	- -	9 (2.1)	12 (2.3)
50 percent or more	- -	40 (3.8)	56 (4.6)	- -	3 (1.0)	5 (1.5)
Percent of students eligible for free or reduced-price school lunch						
Less than 11 percent	- -	62 (3.5)	78 (3.6)	- -	9 (1.6)	18 (2.9)
11 to 30 percent	- -	59 (3.6)	72 (3.1)	- -	10 (1.8)	16 (2.0)
31 to 70 percent	- -	47 (2.9)	58 (3.2)	- -	7 (1.6)	14 (1.8)
71 percent or more	- -	31 (4.3)	53 (5.2)	- -	3 (0.9)	7 (1.6)

- = data not available

NOTE: Instructional rooms include classrooms, computer and other labs, and library/media centers. Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, "Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996," *Statistics in Brief*, NCES 97-944 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-17.

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Appendix table 1-26.

Proficiency of grade 8 mathematics students, by teachers' backgrounds in mathematics: 1988

Student proficiency level	Teachers have taken calculus or below		Teachers have taken advanced mathematics	
	And have no mathematics education	And have a mathematics education	And have no mathematics education	And have a mathematics education
Unable to perform simple mathematics operations on whole numbers	22	21	17	16
Able to perform simple arithmetic operations on whole numbers	40	43	39	37
Able to perform simple arithmetic operations with decimals, fractions and roots	21	24	21	25
Able to perform simple problem solving	17	13	22	22

SOURCE: B. Chaney, *Student Outcomes and the Professional Preparation of Eighth Grade Teachers in Science and Mathematics*, report prepared for the National Science Foundation (Rockville, MD: Westat, Inc., 1995).

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Appendix table 1-27.
**Trends in average scale scores on the National Assessment of Educational Progress in mathematics, by age, sex, and race/ethnicity:
1973-96, selected years**

	All students	Males	Females	Difference, male vs. female	Whites	Blacks	Difference, white vs. black	Hispanics	Difference, white vs. Hispanic
Age 9									
1973	219 (0.8)	218 (0.7)	220 (1.1)	-3 (1.3)	225 (1.0)	190 (1.8)	35 (2.1)	202 (2.4)	23 (2.6)
1978	219 (0.8)	217 (0.7)	220 (1.0)	-3 (1.3)	224 (0.9)	102 (1.1)	32 (1.5)	203 (2.2)	21 (2.4)
1982	219 (1.1)	217 (1.2)	221 (1.2)	-4 (1.7)	224 (1.1)	195 (1.6)	29 (2.0)	204 (1.3)	20 (1.7)
1986	222 (1.0)	222 (1.1)	222 (1.2)	0 (1.6)	227 (1.1)	202 (1.6)	25 (2.0)	205 (2.1)	22 (2.3)
1990	230 (0.8)	229 (0.9)	230 (1.1)	-1 (1.6)	235 (0.8)	208 (2.2)	27 (2.4)	214 (2.1)	21 (2.3)
1992	230 (0.8)	231 (1.0)	228 (1.0)	2 (1.4)	235 (0.8)	208 (2.0)	27 (2.2)	212 (2.3)	23 (2.5)
1994	231 (0.8)	232 (1.0)	230 (0.9)	2 (1.4)	237 (1.0)	212 (1.6)	25 (1.8)	210 (2.3)	27 (2.5)
1996	231 (0.8)	233 (1.2)	229 (0.7)	4 (1.4)	237 (1.0)	212 (1.4)	25 (1.8)	215 (1.7)	22 (2.0)
Age 13									
1973	266 (1.1)	265 (1.3)	267 (1.1)	-2 (1.7)	274 (0.9)	228 (1.9)	46 (2.1)	239 (2.2)	35 (2.4)
1978	264 (1.1)	264 (1.3)	265 (1.1)	-1 (1.7)	272 (0.8)	230 (1.9)	42 (2.1)	238 (2.0)	34 (2.1)
1982	269 (1.1)	296 (1.4)	268 (1.1)	1 (1.7)	274 (1.0)	240 (1.6)	34 (1.9)	252 (1.7)	22 (1.9)
1986	269 (1.2)	270 (1.1)	268 (1.5)	2 (1.9)	274 (1.3)	249 (2.3)	24 (2.6)	254 (2.9)	19 (3.2)
1990	270 (0.9)	271 (1.2)	270 (0.9)	2 (1.5)	276 (1.1)	249 (2.3)	27 (2.6)	255 (1.8)	22 (2.1)
1992	273 (0.9)	274 (1.1)	272 (1.0)	2 (1.5)	279 (0.9)	250 (1.9)	29 (2.1)	259 (1.8)	20 (2.0)
1994	274 (1.0)	276 (1.3)	273 (1.0)	3 (1.6)	281 (0.9)	252 (3.5)	29 (3.7)	256 (1.9)	25 (2.1)
1996	274 (0.8)	276 (0.9)	272 (1.0)	4 (1.4)	281 (0.9)	252 (1.3)	29 (1.6)	256 (1.6)	26 (1.9)
Age 17									
1973	304 (1.1)	309 (1.2)	301 (1.1)	8 (1.6)	310 (1.1)	270 (1.3)	40 (1.7)	272 (2.2)	33 (2.5)
1978	300 (1.0)	304 (1.0)	297 (1.0)	7 (1.4)	306 (0.9)	268 (1.3)	38 (1.6)	276 (2.3)	30 (2.4)
1982	299 (0.9)	302 (1.0)	296 (1.0)	6 (1.4)	304 (0.9)	272 (1.2)	32 (1.5)	277 (1.8)	27 (2.0)
1986	302 (0.9)	305 (1.2)	299 (1.0)	5 (1.5)	308 (1.0)	279 (2.1)	29 (2.3)	283 (2.9)	24 (3.0)
1990	305 (0.9)	306 (1.1)	303 (1.1)	3 (1.5)	310 (1.0)	289 (2.8)	21 (3.0)	284 (2.9)	26 (3.1)
1992	307 (0.9)	309 (1.1)	305 (1.1)	4 (1.5)	312 (0.8)	286 (2.2)	26 (2.4)	292 (2.6)	20 (2.8)
1994	306 (1.0)	309 (1.4)	304 (1.1)	4 (1.8)	312 (1.1)	286 (1.8)	27 (2.1)	291 (3.7)	22 (3.9)
1996	307 (1.2)	310 (1.3)	305 (1.4)	5 (1.9)	313 (1.4)	286 (1.7)	27 (2.2)	292 (2.1)	21 (2.5)

NOTES: Scale scores range from 0 to 300 for every grade level. Standard errors are shown in parentheses.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey, NAEP 1994: Trends in Academic Progress (Washington, DC: National Center for Education Statistics, 1996).

See figure 1-9.

Science & Engineering Indicators – 1988